

Project on occupational accident prevention measures implemented for the construction demand related to  
the Tokyo Olympic and Paralympic Games

Study of occupational accident prevention measures that should be handed  
down as legacy measures

2021 Report

March 2022

Japan Construction Occupational Safety and Health Association

## Introduction

This association was entrusted with the project on occupational accident prevention measures construction demand related to the Tokyo 2020 Olympic and Paralympic Games commissioned by the Ministry of Health, Labour and Welfare. Accordingly, we were to perform the project implementation item of “study of occupational accident prevention measures that should be handed down as legacy measures.” This study was a domestic case study of construction related to the Tokyo Olympic and Paralympic Games. The contents of the study were: (1) measures to prevent occupational accidents that should be handed down; and (2) examples of Japan’s pioneering efforts, such as designers’ considerations made to reduce the risk of construction work in advance starting in the building design stage, etc. This study looked at examples of systems and efforts made by the clients and other stakeholders of the eight businesses involved in the corresponding construction.

Based on the study results, the occupational accident prevention measures that should be handed down as legacy measures are: (1) health and safety efforts by the clients; (2) promotion of risk assessment implementation; etc.; (3) thorough prevention of collisions and falls; and (4) construction of more appealing construction sites. It is our opinion that these measures should become commonplace efforts throughout Japan.

Finally, we would like to express our sincere gratitude to all the clients who cooperated in the study of this project. We would also like to express our deep gratitude to Chairman Katsutoshi Ohdo and other members of each working group for their enthusiastic cooperation on this project.



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## 1 Project methodology

This association has been entrusted with the project on occupational accident prevention measures on construction demand related to the Tokyo 2020 Olympic and Paralympic Games, which is a project commissioned by the Ministry of Health, Labour and Welfare. This report summarizes the project implementation item of “study of occupational accident prevention measures that should be handed down as legacy measures.”

This study is a domestic case study in Japan for the construction related to the Tokyo Olympic and Paralympic Games, which began in fiscal 2021. In this year's report, we will list the businesses that were not summarized last year.

In carrying out this project, this association set up a working group of experts to tackle the item of “occupational accident prevention measures that should be handed down as legacy measures.” This working group worked on the study content and methods.

The contents of the study were: (1) measures to prevent occupational accidents that should be handed down; (2) designers' considerations made to reduce the risk of construction work in advance starting in the building design stage, etc. This study focused on pioneering examples of systems and efforts made by the clients and other stakeholders in Japan.

\*Clients and other stakeholders: Clients, designers, and contractors

## 2 Establishment of the working group

### 2.1 Outline of the establishment of the working group

Project on occupational accident prevention measures implemented for the construction demand related to the Tokyo Olympic and Paralympic Games

Outline of the establishment of the working group for measures to prevent occupational accidents that should be handed down as legacy measures

#### 1. Purpose

When investing in the construction of the Tokyo Olympic and Paralympic Games, there have been various problems and actual cases using measures to prevent occupational accidents at each site. As such, the intention is to implement more thoroughly safety measures based on the findings of study into such actual conditions and cases.

#### 2. Name of the working group

Working group to study the occupational accident prevention measures that should be handed down as legacy measures based on the occupational accident prevention measures implemented for the construction demand related to the Tokyo Olympic and Paralympic Games

#### 3. Content of the study

- (1) Examination of case study methods and study content used for the clients and other stakeholders
- (2) Examination of the content of reports, etc.
- (3) Other items related to business operations

#### 4. Implementation period

April 2021 to March 2022

#### 5. Implementing entity

Japan Construction Occupational Safety and Health Association

## 2.2 Committee members

This working group included experts in each field, foremostly researchers in the fields of health and safety.

Committee member list			
Chairman	Katsutoshi Ohdo	Director-General Center for Research Promotion and International Affairs National Institute of Occupational Safety and Health, Japan	
Committee members	Naotaka Kikkawa	Senior Researcher Construction Safety Research Group National Institute of Occupational Safety and Health, Japan	
	Masahiro Miyazawa	Executive Director Construction Labor Safety Research Group	
	Isao Oki	Chairman of the Japan Building Construction Association (General Incorporated Association Construction Industry Professional Association)	
	Seizi Kunii	General Manager, Safety Environment Support Office, Technology Headquarters, Nakano Corporation	
	Hisanori Kubo	Manager (Tokyo) Safety and Quality Environment Headquarters ASANUMA CORPORATION	
	Yasunari Asakura	General Incorporated Association National Small and Medium Construction Industry Association (Asakuragumi Co., Ltd.)	
	Hiroyuki Shibazaki	General Incorporated Association National Small and Medium Construction Industry Association (Asakuragumi Co., Ltd.)	
	Yuji Munakata	Counselor, National Low-rise Housing Labor Safety Council (originally with MISAWA HOMES CO., LTD.)	
	Ministry of Health, Labour and Welfare	Kei Saruwatarai	Technical Examiner Safety Division Construction Safety Measures Office Labour Standards Bureau
		Masaomi Suzuki	Guidance Manager Safety Division Construction Safety Measures Office Labour Standards Bureau (listed in random order with titles omitted)

### 2.3 Study background of the working group

The working group met three times throughout the year. Since it was difficult to hold a group-type study meeting due to the impact of COVID-19, the first and second meetings were held in the form of a “document meeting” that involved members simply sending in and reviewing materials. The third meeting was an online meeting using Zoom, since, by then, a system for doing so for the office and the members had been put in place.

#### (1) 1st working group meeting

Implementation date: May 10, 2021 (Monday) – A study period of about one week was set up, and opinions were solicited.

Meeting style: A “document meeting” that involved members simply sending in and reviewing materials.

Content of the study: Examination of the study methods and content of the clients and other stakeholders

Study results:

##### (1) Study methods of the clients and other stakeholders

Due to the impact of COVID-19, the option chosen was for a “document meeting,” with the understanding that should the situation surrounding COVID-19 change, the transition would be made to a traditional discovery style meeting.

##### (2) Content of the study

Approval was given to use the same content of the questionnaire from last year for this year’s questionnaire. The study method and related was also approved.

#### (2) The 2nd working group meeting

Implementation date: August 11, 2021 (Wednesday) A study period of about one week was set up, and opinions were solicited.

Meeting style: A “document meeting” that involved members simply sending in and reviewing materials.

Content of the study: Confirmation of study content and interim reports

Study results:

##### (1) The progress of the legacy case studies

Each committee member confirmed the content and approved the study method.

##### (2) The interim report (draft)

The content was approved.

##### (3) Other items

Although the situation was very difficult due to COVID-19, the chairman of the working group instructed that a traditional discovery meeting could be held within a reasonable scope assuming adequate infection prevention controls.

#### (3) The 3rd working group meeting

Implementation date: February 21, 2022 (Monday)

Meeting style: Zoom videoconference

Content of the study: About the report (draft)

Study results:

##### (1) About the report (draft)

The content was approved. It was decided that an excerpt version would be prepared by the secretariat and then confirmed by the chairman.

(2) Other matters

Each committee member recommended that the results of this project be widely disseminated.

In addition, videoconferences were held with the chairman and others as deemed necessary. (July 16th and September 16th)

### 3 Study of clients and other stakeholders

#### 3.1 Method of Study

Using the questionnaire, the content of which was decided upon by the working group, a study of actual cases of occupational accident prevention measures that should be handed down as legacy measures was made using the list of facility sites related to the Tokyo Olympic and Paralympic Games provided by the Ministry of Health, Labour and Welfare, except for the businesses that were compiled in the report last year. Kokyo Gaien National Garden was excluded from the survey because the competition venue was changed from Tokyo to Sapporo. As the state of emergency due to the spread of COVID-19 continued, we conducted a written survey by e-mail and regular mail to the target business sites to prevent the spread COVID-19. Since the state of emergency was lifted in the fall of this year, two traditional discovery meetings were conducted.

Table 2: List of businesses subject to the written questionnaire

	Venue Name	Owner	Period of Construction	Type of Construction	Competition/Type
1	Ariake Gymnastics Centre	The Tokyo Organising Committee of the Olympic and Paralympic Games	Nov. 15, 2017 – Oct. 2019	Temporary facility	[Olympic] Artistic Gymnastics [Paralympic] Boccia
2	Aomi Urban Sports Park	The Tokyo Organising Committee of the Olympic and Paralympic Games	Apr. 2019 - Sep. 2019 Dec. 2019 - Jun. 2020	Temporary facility	[Olympic] Cycling (BMX Freestyle, BMX Racing), Skateboarding
3	Odaiba Marine Park	The Tokyo Organising Committee of the Olympic and Paralympic Games	Dec. 2019 - Jun. 2020	Temporary facility	[Olympic] Triathlon, Swimming (Marathon Swimming 10km) [Paralympic] Triathlon
4	Oi Hockey Stadium	Tokyo Metropolitan Government	Jan. 5, 2018 – Jun. 27, 2019	Permanent facility	[Olympic] Hockey
5	Sea Forest Waterway	Tokyo Metropolitan Government	Jul. 29, 2016 – May 31, 2019	Permanent facility	[Olympic] Rowing, Canoe Sprint [Paralympic] Canoe, Rowing
6	Yumenoshima Park Archery Field	Tokyo Metropolitan Government	Aug. 15, 2016 – Mar. 31, 2017	Permanent facility	[Olympic] Archery [Paralympic] Archery
7	Asaka Shooting Range	The Tokyo Organising Committee of the Olympic and Paralympic Games	Feb. 2019 - Mar. 2020	Temporary facility	[Olympic] Shooting [Paralympic] Shooting
	Kokyo Gaien National Garden	The Tokyo Organising Committee of the Olympic and Paralympic Games	*Construction was canceled since the competition ended up being held in Sapporo.		

### 3.2 Survey form content

The questionnaire was the same as used in last year's work group.

<div style="border: 1px solid black; padding: 5px; display: inline-block;">Commissioned by the Ministry of Health, Labour and Welfare</div>										
<p>Measures to prevent occupational accidents associated with rise in construction demand with Tokyo Olympic and Paralympic Games-related projects</p> <p>Review of Occupational Accident Prevention Measures passed on to future construction industry as legacy Case Study (Contractor)</p>										
<p>We are surveying pioneering measures to prevent occupational accidents taken in construction of facilities as one of the lasting benefits of the Tokyo Olympic and Paralympic Games. As part of this survey, we would like to ask about the construction your company has received. The information you provide and documents you attach may be included in our report and made available to the public. Please note any information that you wish to remain private.</p>										
<p><span style="border: 1px solid black; padding: 2px;">Construction Overview</span> * Please attach an overview of construction. If you are unable to attach an overview, please answer the following.</p>										
<table border="1" style="width: 100%;"><tr><td style="width: 30%; padding: 5px;">Name of facility</td><td style="width: 70%;"></td></tr><tr><td style="padding: 5px;">Location of facility</td><td></td></tr><tr><td style="padding: 5px;">Client name</td><td></td></tr><tr><td style="padding: 5px;">Contractor</td><td></td></tr><tr><td style="padding: 5px;">Construction period</td><td></td></tr></table>	Name of facility		Location of facility		Client name		Contractor		Construction period	
Name of facility										
Location of facility										
Client name										
Contractor										
Construction period										
<p>1. As the contractor, did the client or designer conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the client establish any other systems or measures? If yes, what was your experience with these during the construction work?</p>										
<table border="1" style="width: 100%;"><tr><td style="width: 15%; padding: 5px; text-align: center;">Yes/No</td><td style="width: 85%;"></td></tr><tr><td colspan="2" style="padding: 5px;">If yes, please provide specific information. Please attach any relevant documents.</td></tr><tr><td colspan="2" style="height: 150px;"></td></tr></table>	Yes/No		If yes, please provide specific information. Please attach any relevant documents.							
Yes/No										
If yes, please provide specific information. Please attach any relevant documents.										

2 . Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.

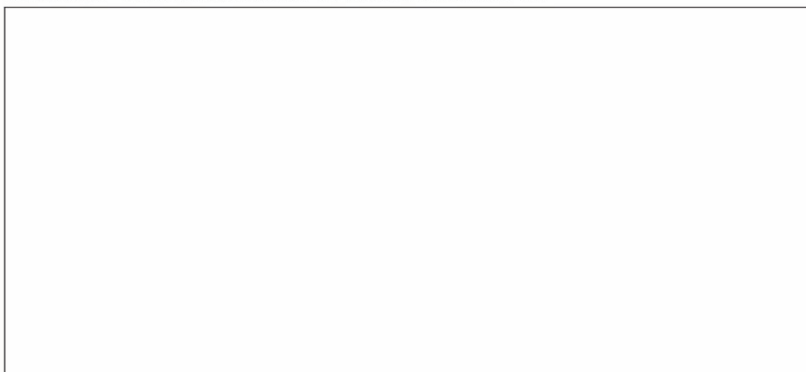
Yes/No
If yes, please provide specific information. Please attach any relevant documents. -----

3 . As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?

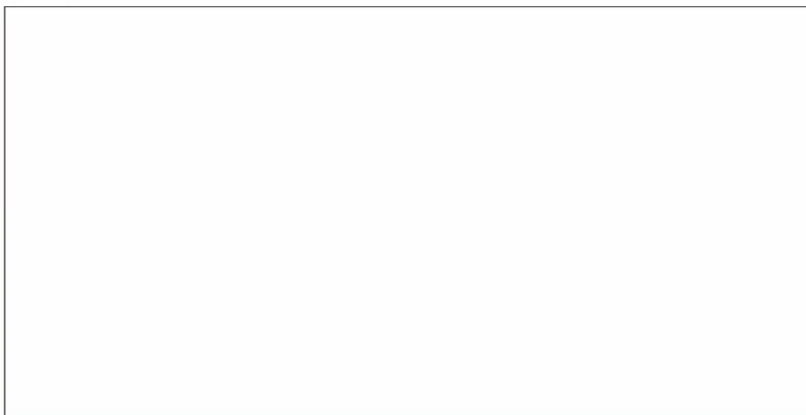
Yes/No
If yes, please provide specific information. Please attach any relevant documents. -----



4. Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?



5. As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.



6 . Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)

Please provide specific information. Please attach any relevant documents.

7 . Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.

Yes/No
If yes, please provide specific information. Please attach any relevant documents.

8 . Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.

Yes/No
If yes, please provide specific information. Please attach any relevant documents.

9 . Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.

1 0 . What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as an client ordering construction.

1 1 . Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.

Date:			
Company address	Postal Code		
Tel.		Fax	
Company name			
Department		Officer in charge	
Email address of officer in charge	Please provide an email address so that, if necessary, we may contact you to request additional information on the answers you provided.		

\* Thank you for your cooperation.

### 3.3 Study results

The study was conducted on all seven venues, and the results of 11 construction projects were obtained.

Details are as shown in the next section.

Table List of surveyed sites

	Name of the Venue	Name of the Construction Project	Name of the Client
1	Ariake Gymnastics Centre	New Construction of the Ariake Gymnastics Centre	The Tokyo Organising Committee of the Olympic and Paralympic Games
2	Ariake Urban Sports Park	Tokyo Olympic and Paralympic Games Temporary Overlay Development (Part 17) Ariake BMX Course Venue	The Tokyo Organising Committee of the Olympic and Paralympic Games
3	Odaiba Marine Park	Tokyo Olympic and Paralympic Games Temporary Overlay Development (Part 16) Odaiba Marine Park	The Tokyo Organising Committee of the Olympic and Paralympic Games
4	Oi Hockey Stadium	New Construction, Renovation, and Related Construction of the Oi Hockey Stadium (tentative name) (29)	Tokyo Metropolitan Government
5	Sea Forest Waterway	Construction of the 2015 Sea Forest Waterway	Tokyo Metropolitan Government
6	Yumenoshima Park Archery Field	(1) Infrastructure development of the Yumenoshima Park Archery Field Facilities (2) Infrastructure development of the Yumenoshima Park Archery Field Facilities (Part 2) (3) Construction of the Yumenoshima Park Archery Field Facilities (4) Preparation of the Yumenoshima Park Archery Field Facilities (5) Ground Construction for Yumenoshima Park	Tokyo Metropolitan Government
7	Asaka Shooting Range (JGSDF Asaka Training Field)	Tokyo Olympic and Paralympic Games Temporary Overlay Development (Part 6) Asaka Shooting Range	The Tokyo Organising Committee of the Olympic and Paralympic Games

1. Ariake Gymnastics Centre

Construction Project Name: New Construction of the Ariake Gymnastics Centre

Construction site: 1-8 Ariake, Koto-ku, Tokyo

Client: The Tokyo Organising Committee of the Olympic and Paralympic Games

Designer: Nikken Sekkei Co., Ltd.

Contractor: Shimizu Corporation

Construction period: November 15, 2017 to October 25, 2019

1	Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.	<p>⇒Yes</p> <ul style="list-style-type: none"> <li>· In addition to the temporary infrastructure development such as spectator seats and competition space, various construction activities such as bringing in and installing equipment necessary for operation were planned, making it possible to perform different construction activities side by side with each other. Safety management and instructions were implemented by the contractors as necessary to prevent accidents, including such supervision and instructions for the various construction workers entering the construction site.</li> <li>· We established contact procedures to quickly ascertain accurate information and to respond appropriately in the event of an accident. We clarified the contact system within the Organising Committee, created a reporting form, and established system for confirming recurrence prevention measures.</li> <li>· We established a safety patrol system appropriate to our role as a client. We directly checked the work clothing, protective equipment, work environment and so forth and construction organization documents, as well, at the construction site.</li> <li>· In the technical proposal at the time making our orders, we adopted a beam construction method that reduces that amount of aerial work.</li> </ul>
2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	<p>⇒Yes</p> <p>We used BIM in anticipation of renovating the exhibition hall for use after the competition events. Since the equipment machine room was set up on the 3<sup>rd</sup> floor, we needed to investigate a complicated means for fitting it into the allowed space, and we used design information to examine a temporary design plan that would be safe during the temporary construction stage as well.</p>
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	<p>⇒No</p>

4	<p>Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?</p>	<p>Since the order was made by the design-build method, we received technical proposals from the contractors at the construction stage starting when ordering began. In addition, the contractor actively participated in regular meetings for the implementation design, and the design was made with a focus on the construction process.</p> <p>In particular, since it was garnering lots of attention from the public as it was an Olympic and Paralympic Games facility, the construction plan was adjusted with consideration for putting safety first. We also made a detailed plan as the schedule would not allow any delays to the construction for these important games.</p> <p>Specifically, we proposed a construction plan using the mobile scaffolding for the interior and exterior construction. We were able to establish a cycle process, which in turn improved workability, safety, and made for efficient construction within a limited amount of space.</p>
5	<p>As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.</p>	<p>Yes, it improves them.</p> <p>I think doing so ensures that the team's awareness regarding safety is at a higher level of consideration starting in the design stage.</p> <p>As a specific example, before installing the spectator seats, when we were constructing the ceiling part of the upper part of the spectator seats (since the ceiling at the bottom of the left and right roots of the girder, and the floor directly below, are tilted diagonally because the spectator seats are not installed yet), we decided to build a mobile scaffold to better ensure workability and safety. From the time of design to the construction stage, site agents drew sketches and examined them many times.</p>
6	<p>Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)</p>	<p>The beam lift-up method was adopted in the technical proposal during the design-build order phase.</p> <p>This reduced the amount aerial work needed and also helped shortened the construction period.</p>

7	Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.	<p>⇒Yes</p> <ul style="list-style-type: none"> <li>• We adopted a construction method using a wooden arch grounded on a pedestal, attached hardware, electrical equipment, and that had the wiring installed in advance on the pedestal, and that had the entire roof divided into five parts that were lifted up and put into place.</li> <li>• We used grandstand finishing work that was unitized and assembled on the ground as much as possible.</li> <li>• We assemble the chairs on the ground as much as possible before installing them.</li> <li>• We trained workers engaged in aerial work such as steel frame construction and scaffolding assembly and dismantling work to use harness safety belts.</li> </ul>
8	Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.	<p>Women-Oriented Initiatives</p> <p>⇒Yes</p> <ul style="list-style-type: none"> <li>• There are toilets and changing rooms that were exclusively for women.</li> <li>• Communication among female employees was treated with importance.</li> </ul> <p>Youth-Oriented Initiatives</p> <p>⇒Yes</p> <ul style="list-style-type: none"> <li>• Meetings hosted by site agents were held regularly. Those meetings allowed for stakeholders to consider and discuss how techniques could be handed down, as well as proposals and problems.</li> </ul>
9	Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.	<ul style="list-style-type: none"> <li>• Because it was an Olympic and Paralympic Games facility, there were a lot of interviews on TV and so forth and guest visits from overseas, but we were able to cooperate quite a bit, which in turn actually increased the morale of the work site.</li> <li>• In our training for visitors to the site, the site representative, in response to the circumstances at the time of the interviews and the inspections, instructed those visitors to "be more careful because it is a facility that is gaining a lot of attention."</li> </ul>
10	What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.	<ul style="list-style-type: none"> <li>• We had technical proposals to reduce aerial work as much as possible and shorten the construction period as much as possible. Such ideas also came from outside our facility.</li> </ul>



11	Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.	<p>It has received a lot of attention from the public, and we received more requests for inspections and interviews than ever before.</p> <p>In addition, we were very aware that it was quite different from the usual because of the interviews without appointments and photography from a distance using telephoto lenses.</p> <p>We had the experience of a lifetime being in front of many of the latest technologies and ideas that can only be witnessed by the scale of this Olympic and Paralympic Games facility.</p> <p>We strove toward our big goal of "building an Olympic and Paralympic Games facility," by coming together as designers, contractors, and clients to board this "large ship" and face the corresponding difficulties together.</p>
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2. Ariake Urban Sports Park

Construction Project Name: Tokyo Olympic and Paralympic Games Temporary Overlay Development  
(Part 17) Ariake BMX Course Venue

Construction site: 1-7-2 Ariake, Koto-ku, Tokyo

Client: The Tokyo Organising Committee of the Olympic and Paralympic Games

Designer: Daiwa Lease Co., Ltd. and TSP Taiyo Inc. Joint Venture

Contractor: Daiwa Lease Co. Ltd. and TSP Taiyo Inc. Joint Venture

Construction period: November 1, 2019 to June 30, 2021

(Construction suspended: August 1, 2020 to February 19, 2021)

1	<p>Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.</p>	<p>⇒Yes</p> <p>(Design stage)</p> <ul style="list-style-type: none"> <li>· We took advantage of the features of the design-build method to make sure that safety was fully coordinated with the construction contractor from the implementation design stage and that the plan was fully coordinated.</li> </ul> <p>(Other initiatives)</p> <ul style="list-style-type: none"> <li>· During the construction stage, in addition to the construction of temporary infrastructure such as prefabricated buildings and tents for operation, seats for spectators, and competition space, various constructions such as bringing in and installing equipment necessary for operation were planned, and we were able to perform different construction operations side by side to each other. Safety management and instructions were implemented by contractors as necessary to prevent accidents, including needed supervision and instructions for the various construction workers entering the construction site.</li> <li>· We established contact procedures to quickly ascertain accurate information and to respond appropriately in the event of an accident. We clarified the contact system within the Organising Committee, created a reporting form, and established system for confirming recurrence prevention measures.</li> <li>· We established a safety patrol system appropriate to our role as a client. We directly checked the work clothing, protective equipment, work environment and so forth and construction organization documents, as well, at the construction site.</li> <li>· There was a matter unique to the venue in that the land was vacant before the start of construction. We gave instructions to reduce occupational accidents by taking measures against heat and strong winds during the temporary overlay construction and the other construction at the same site.</li> </ul>
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2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	⇒No
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	⇒No
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	<ul style="list-style-type: none"> <li>• Since we used the design-build method for this project, the same company was able to handle everything from design to construction. As we worked on this venue, we kept close contact, starting in the design stage, by utilizing joint verification at the site, weekly regular meetings and task forces that included the clients, designers and contractors.</li> <li>• In order to reduce the risk that we envisioned could occur during construction, documents of various survey results (boring survey, soil analysis results, etc.) were presented to the contractors starting in the design stage, and then reflected in the design conditions for structural calculation of the building. The contractors also checked the site and tried to reduce the risk during construction by confirming whether the design content could be constructed at this site without danger.</li> <li>• As for the content of the meetings, we arranged for a wide range of content such as clarifying the issues that occurred while proceeding with the project, instructions for reflecting the requests from the parties concerned in the implementation design, cost adjustment, construction process schedule, and so forth.</li> </ul>
5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	<ul style="list-style-type: none"> <li>• We believe that health and safety during construction is improved by making considerations in the design stage to reduce and eliminate risks.</li> <li>• As we have done for this venue, we feel that it is possible to reduce the probability of accidents during construction by designing based on the results of various studies and by reducing and eliminating risks in the work that the contractors have experienced in the past.</li> </ul>

6	<p>Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)</p>	<ul style="list-style-type: none"> <li>• Since this venue was a temporary venue for the Olympic and Paralympic Games, we did not employ any new construction methods to reduce or eliminate risk during the design stage or construction stage. However, since the contractor was also the leasing company, we were able to build prefabs, unit houses and tents using learning from past experiences to reduce and eliminate risk.</li> <li>• Our plan was to be organized in a way to perform completely different tasks such as installing unit houses, installing security fences, wiring, and developing fields and equipment for competitions. We believe that the staging and coordination of work processes out of consideration for the order of the construction was an important factor for safety management. In addition, in regard to construction projects placed by other departments of the Organising Committee, we carried out process coordination among the contractors with consideration to information coordination with the contractor so that the construction could be carried out safely.</li> </ul>
7	<p>Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.</p>	<p>⇒Yes</p> <ul style="list-style-type: none"> <li>• At the training offered by Daiwa Lease Co., Ltd. for new workers and foremen's meetings held in the morning, noon, and evening, instruction was given to workers on how to use KY (hazard prediction) techniques, as well how to avoid falls, collisions, and public injury.</li> <li>• Recognizing that accidents are likely to occur at the start of new construction, we, the client, proactively provided guidance pertaining to site patrol inspections and site agents to prevent accidents.</li> <li>• Since the site was an open location, we also implemented appropriate measures to prevent heat stroke in the summer. We displayed temperature and humidity at the morning assembly place, informed workers of the risk of heat stroke, had them take frequent breaks based on the WBGT value, and promoted hydration and proper consumption of electrolytes by providing an environment where salt candies and beverages could easily be obtained.</li> </ul>

8	<p>Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.</p>	<p>Women-Oriented Initiatives ⇒Yes</p> <ul style="list-style-type: none"> <li>· The inside of the site office was cleaned and kept tidy every day, and there was a break room and a nap room exclusively for women. In addition, toilets for women were installed outside the site office, creating a site where women could work safely and with peace of mind.</li> </ul> <p>Youth-Oriented Initiatives ⇒Yes</p> <ul style="list-style-type: none"> <li>· The young foremen of the prime contractor and the subcontractors participated in the monthly foreman's meeting, in which communication with the younger people was proactively made by giving them an opportunity to feel free to consult about problems in the site, workplace improvement, etc.</li> </ul>
9	<p>Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.</p>	<ul style="list-style-type: none"> <li>· This project required highly managed construction schedules for each area, such as dealing with construction congestion among the various construction departments, since there were four competition fields (BMX race, BMX freestyle, skateboard (Park and Street)) in the same venue, as well as temporary overlays, FOP construction, test events, and IF inspection (homologation).</li> </ul> <p>That being the case, as a health and safety measure during the construction of this venue, we held meetings to confirm the construction content and construction time, including the site agent, before the construction of other departments, to ensure that there was nothing that the site agent who supervises the site was unaware of. This made it possible to implement training for new workers and foremen's meetings held in the morning, noon, and evening, as well as instruction to workers about how to use KY techniques, as well as how to avoid falls, collisions, and public injury.</p>
10	<p>What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.</p>	<p>Based on our experience of taking measures to prevent occupational accidents in the past, we believe that the following five items are the occupational accident prevention measures that should be handed down as legacy measures:</p> <ol style="list-style-type: none"> <li>1. Thorough health and safety training</li> <li>2. Thorough training for new workers</li> <li>3. Thorough KY activities</li> <li>4. Design that is thorough in its consideration for risks that can occur during construction</li> <li>5. Building a cooperative system of clients, designers, and contractors</li> </ol>

11	Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.	<ul style="list-style-type: none"> <li>• As we explained above, this construction project was a project that required highly managed construction schedules for each area, such as dealing with construction congestion among the various construction departments, since there were four competition fields (BMX race, BMX freestyle, skateboard (Park and Street)) in the same venue, as well as temporary overlays, FOP construction, test events, and IF inspection (homologation).</li> </ul> <p>Thanks to the clients, designers, and contractors working together to tackle and solve problems, this venue was completed in a manner that we can be proud to share with all the world.</p>
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3. Odaiba Marine Park

Construction Project Name: Tokyo Olympic and Paralympic Games Temporary Overlay Development  
(Part 16) Odaiba Marine Park

Construction site: Daiba 1-chome, Minato-ku, Tokyo

Client: The Tokyo Organising Committee of the Olympic and Paralympic Games

Designer: Daiwa Lease Co., Ltd.

Contractor: Daiwa Lease Co., Ltd.

Construction period: December 1, 2019 to December 31, 2021

(Construction suspended: September 1, 2020 to January 6, 2021)

1	<p>Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.</p>	<p>⇒Yes</p> <p>(Design stage)</p> <ul style="list-style-type: none"> <li>• We took advantage of the features of the design-build method to make sure that safety was fully coordinated with the construction contractor from the implementation design stage and that the plan was fully coordinated.</li> </ul> <p>(Other initiatives)</p> <ul style="list-style-type: none"> <li>• During the construction stage, in addition to the construction of temporary infrastructure such as prefabricated buildings and tents for operation, seats for spectators, and competition space, various constructions such as bringing in and installing equipment necessary for operation were planned, and we were able to perform different construction operations side by side to each other. Safety management and instructions were implemented by contractors as necessary to prevent accidents, including needed supervision and instructions for the various construction workers entering the construction site.</li> <li>• We established contact procedures to quickly ascertain accurate information and to respond appropriately in the event of an accident. We clarified the contact system within the Organising Committee, created a reporting form, and established system for confirming recurrence prevention measures.</li> <li>• We established a safety patrol system appropriate to our role as a client. We directly checked the work clothing, protective equipment, work environment and so forth and construction organization documents, as well, at the construction site.</li> <li>• Since this venue is a tourist spot, there was a period during the construction where the work was carried out with a part of the venue open to the public. We instructed both the workers and third parties on safety measures and managed them accordingly.</li> <li>• Since the construction of the venue was often carried out on a sandy beach, we urged everyone to pay extra attention to safety measures related to their footing.</li> </ul>
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2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	⇒No
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	⇒No
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	<p>We held regular meetings once a week starting in the design stage. During such meetings, we included instructions that the design should take safety measures into consideration during construction. Specifically, since we would be building a unit house for operation on a sandy beach that is quite close to the coast, we designed it to be raised on an H-shaped steel frame to prevent water from entering during high tides.</p> <p>In addition, for the construction ordered by other departments of the Organising Committee, we made adjustments so that the generator installed by the contractor would not be exposed to water at high tide.</p> <p>We tried to reduce discrepancies as much as possible after starting the construction, by taking such actions as gathering all the people involved in wire routing to check in together and create the corresponding drawings for that routing at the meeting.</p>
5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	<p>By anticipating construction starting in the design stage, it was easier to visualize things in advance, which improved the view of things once entering the construction site.</p> <p>Specifically, starting in the design stage, we anticipated the risks pertaining to the raised part of the H-shaped steel frame built in the coastal area and the frame of the H-shaped structure for installing the video board.</p>
6	Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)	<ul style="list-style-type: none"> <li>Our plan was to be organized in a way to perform completely different tasks such as installing unit houses, installing security fences, wiring, and developing fields and equipment for competitions. We believe that the staging and coordination of work processes out of consideration for the order of the construction was an important factor for safety management. In addition, in regard to construction projects placed by other departments of the Organising Committee, we carried out process coordination among the contractors with consideration to information coordination with the contractor so that the construction could be carried out safely.</li> </ul>
7	Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.	<p>⇒Yes</p> <p>During our morning and after-lunch meetings, we checked the work content, progress, and safety management.</p>



8	Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.	<p>Women-Oriented Initiatives ⇒Yes</p> <p>Many female employees were on site, and we actively entrusted them with work.</p> <p>Youth-Oriented Initiatives ⇒Yes</p> <p>In order to keep aware of everything going on at the entire site, we entrusted the inspection work and reporting to young workers.</p>
9	Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.	<p>Since it was a large site, we devised means such as enlarging the workers' rest area sign and providing salt candy as a measure against heat stroke.</p> <p>We asked construction contractors who place orders from other departments of the Organising Committee to come to a meeting before starting construction and let them know the rules of the site in advance. In addition, we asked the contractors to participate in the morning meetings and share the work content of other construction activities.</p> <p>We set up guides at the gates between the construction area and the public areas of the surrounding park. We attended regular meetings with the Tokyo Metropolitan Government Bureau of Ports, including the park manager, which also served as a safety measure.</p>
10	What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.	We made sure that our discussions in the design stage kept the focus on safety measures.
11	Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.	<p>Since the construction progressed with different content and greater speed than usual, we talked to the contractors many times to remind them that the priority was not to be on the construction process alone.</p> <p>All the contractors involved in this competition worked toward one goal. Having a clear target is key to ensuring safety.</p>

4. Oi Hockey Stadium

Construction Project Name: New Construction, Renovation, and Related Construction of the Oi Hockey Stadium (tentative name) (29)

Construction site: 4-1-19 Yashio, Shinagawa-ku, Tokyo, etc.

Client: Tokyo Metropolitan Government

Designer: Azusa Sekkei Co., Ltd.

Contractor: Kikuchi Construction Co., Ltd., etc.

Construction period: December 15, 2017 to June 27, 2019

1	Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.	⇒Yes <ul style="list-style-type: none"> <li>• In order to prevent third-party accidents, we examined the temporary design drawing that separates the flow lines of general people such as pedestrians and park users inside and outside the construction site from the flow lines of construction vehicles, and followed them accordingly during the construction.</li> </ul>
2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	⇒No
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	⇒No
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	<ul style="list-style-type: none"> <li>• During the design stage, we made it a point to hold meetings and utilize contact coordination with the designers to reduce the risk anticipated during construction.</li> <li>• In order to reduce the risk of workers falling during construction, the roof shape has a simple one-sided flow to improve workability and is designed with safety in mind.</li> <li>• Our plan was to reduce the risk by using PC materials for the steps of the spectators' seats and by reducing site work such as formwork and concrete placement.</li> </ul>
5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	<ul style="list-style-type: none"> <li>• We believe that health and safety during construction can be improved by making consideration of ways to reduce risk of site work from the design stage.</li> </ul>

6	Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)	<ul style="list-style-type: none"> <li>• In order to reduce the risk of workers falling during construction, the roof shape has a simple one-sided flow to improve workability and is designed with safety in mind.</li> <li>• Our plan was to reduce the risk by using PC materials for the steps of the spectators' seats and by reducing site work such as formwork and concrete placement.</li> </ul>
7	Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.	<p>⇒Yes</p> <ul style="list-style-type: none"> <li>• We examined the construction method to reduce aerial work, and were able to do so by constructing the girder when constructing the steel frame.</li> <li>• When installing scaffoldings, as a safety measure, we adopted the handrail-first construction method, which is a Tokyo standard.</li> <li>• Workers engaged in aerial work such as steel frame construction work used full harness safety belts.</li> </ul>
8	Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.	<p>Women-Oriented Initiatives</p> <p>⇒Yes</p> <ul style="list-style-type: none"> <li>• We worked to improve the working environment for female workers by installing toilets and changing rooms exclusively for women.</li> </ul> <p>Youth-Oriented Initiatives</p> <p>⇒No</p>
9	Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.	<ul style="list-style-type: none"> <li>• There were many tours and inspections of various construction sites by the IOC, IF, and domestic and foreign media at the time of construction. As such, it was difficult in terms of safety management and process management, such as setting up a safety zone on the tour and inspections routes and adjusting the construction sites on the day such tours and inspections.</li> <li>• At the site, the supervisor in charge inspected the usage status of power tools, stepladders, scaffolding boards, safety tools, etc., during regular site patrols and gave feedback and instructions as needed. In this manner, we tried to raise the awareness of each and every worker.</li> </ul>

10	<p>What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.</p>	<ul style="list-style-type: none"> <li>• Frontloading, which examines the prevention of occupational accidents at construction sites starting in the design stage, is effective as an occupational accident prevention measure.</li> <li>• It is important to reduce collisions and slip, trip, and fall accidents.</li> <li>• There is a lot of special training these days regarding the proper use of power tools. However, it is dangerous to assume that something is safe just because you have undergone the corresponding training, or that something is dangerous because you have not undergone the corresponding training.</li> </ul>
11	<p>Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.</p>	<ul style="list-style-type: none"> <li>• Because it was a construction site that attracted worldwide attention, in addition to health and safety management, we implemented a wide range of activities such as process management aligned with the construction period, security measures, use of environmentally friendly materials, and accessibility measures.</li> <li>• Because it was an Olympic Games facility, the scale of construction was large, and the number of contractors and the number of workers working on site every day were very large. When there are many people, it is typically very difficult to convey safety information to everyone, and the risk of accidents is likely to increase. However, thanks to the daily efforts of each contractor, we were able to complete the construction safely.</li> </ul>

5. Sea Forest Waterway

Construction Project Name: Construction of the 2015 Sea Forest Waterway

Construction site: Aomi 3-chome, Koto-ku, Tokyo

Client: Tokyo Metropolitan Government

Designer: (basic design) Pacific Consultants Co., Ltd.

(implementation design) Taisei / Toyo / Swing / Hitachi Zosen cross-industry specific construction joint venture

Contractor: Taisei / Toyo / Swing / Hitachi Zosen cross-industry specific construction joint venture

Construction period: March 4, 2016 to May 31, 2019

1	Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.	⇒Yes Our goal was reliable and safe construction, so upon ordering construction work with the design-build method, we requested technical proposals on construction methods and process management using that method.
2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	⇒Yes The design drawings for the closing dike, floodgate, and the attachment part on the north side of the eastern closing dike were made into 3D models (using 3D-CAD), which were useful for interference checks during the design stage and construction planning during the construction stage. Deepening the understanding of the shape of the structure in the construction plan also contributed to the health and safety of the project.
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	⇒No
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	Once a month, we held a project meeting where designers, clients, and contractors met together. During these meetings, in order to work toward preventing accidents, we shared information on places where construction congestion was anticipated and information on third parties coming to the site due various events.

5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	We considered risks that we could reduce or eliminate by formulating a detailed construction plan and identifying dangerous parts of the construction process during the design stage.
6	Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)	During the implementation design stage, we decided to reexamine the types of work that involve diving work to reduce the associated risks, and to revise the temporary support work (number of girder steps) associated with the construction of the floodgate.
7	Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.	⇒Yes The Tokyo Port Construction Office, which was in charge of the construction, set up a Tokyo Port Construction Office Construction Safety Committee to set priority goals including prevention of falls, engaged third-party accident prevention assistance, and carried out construction safety patrols every month. The Accident Prevention Eight Measures, which summarize the items that the contractor should pay attention to regarding aerial work, and so forth, and the Look-with-your Eyes Safety Measures Manual, which explains the contents of the inspection, were used during the patrols to provide guidance to and to alert specific contractors of potential issues.
8	Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.	Women-Oriented Initiatives ⇒Yes When ordering construction work, we requested the installation of a women-only toilets. In addition, according to the interview with the contractor, a break room for women and work clothes for women, and women's social gatherings between JVs of different industries were implemented to create a comfortable working environment for women. Youth-Oriented Initiatives ⇒Yes According to the contractor, they worked to create a comfortable working environment by setting up shops and break rooms on site, and by thoroughly training new workers and actively promoting young people to responsible positions to improve capability and motivation among them.
9	Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.	In order to support the operation of construction vessels together with general vessels, GPS and other equipment were newly installed on the construction vessels to acquire location information and Tokyo Port Radio.

10	<p>What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.</p>	<p>The department in charge of construction formulated a Look-with-your Eyes Safety Measures Manual, which explains the content of inspections carried out by construction safety patrols, and worked to improve the knowledge of construction safety among construction-related personnel. The content of this manual will be enhanced based on updates such as revisions to laws and regulations and past accident cases.</p> <p>We believe it is necessary to continue such efforts to improve knowledge about construction safety.</p>
11	<p>Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.</p>	<p>Many staff members worked hard to achieve a single goal with a strong sense of mission to maintain the venue for the Games. It was a very busy but rewarding experience.</p>

6. Yumenoshima Park Archery Field

6-1. Construction Project Name: Infrastructure development of the Yumenoshima Park Archery Field

Facilities

Construction site: Yumenoshima 2-chome, Koto-ku, Tokyo

Client: Olympic and Paralympic Games Venue Developing Office, Construction Section, Tobu District Park Office, The Bureau of Construction, Tokyo Metropolitan Government

Designer: Ohba Co., Ltd.

Contractor: Shinnihon-kohyo Corporation

Construction period: August 15, 2016 to March 3, 2017

1	Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.	⇒No
2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	⇒No
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	⇒No
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	Nothing in particular
5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	If the construction method is the kind that can result in danger, then health and safety will be improved by eliminating such risks in the design stage.



6	Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)	Nothing in particular
7	Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.	⇒Yes Construction safety patrols by the Bureau of Construction, Tokyo Metropolitan Government and Tobu District Park Office, etc.
8	Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.	Women-Oriented Initiatives ⇒No  Youth-Oriented Initiatives ⇒Yes We visited the site to improve the technology and ensure it will be handed down.
9	Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.	Nothing in particular
10	What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.	<ul style="list-style-type: none"> <li>· Thorough safety training for site supervisors</li> <li>· Thorough sharing and training of safety matters for subcontractors</li> <li>· Strengthening communication skills between site supervisors and subcontractors</li> </ul>
11	Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.	Since the work was related to the Olympic Games, there was a lot of importance placed on coordinating with external organizations, budget, construction period, and so forth as we proceeded with the project.

6-2. Construction Project Name: Infrastructure development of the Yumenoshima Park Archery Field Facilities (Part 2)

Construction site: Yumenoshima 2-chome, Koto-ku, Tokyo

Client: Olympic Games and Paralympic Games Venue Developing Office, Construction Section, Tobu District Park Office, The Bureau of Construction, Tokyo Metropolitan Government

Designer: Ohba Co., Ltd.

Contractor: Tenma Kensetsu Co., Ltd.

Construction period: November 26, 2017 to March 27, 2018

1	Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.	⇒No
2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	⇒No
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	⇒No
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	Nothing in particular
5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	If the construction method is the kind that can result in danger, then health and safety will be improved by eliminating such risks in the design stage.

6	Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)	Nothing in particular
7	Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.	⇒Yes Construction safety patrols by the Bureau of Construction, Tokyo Metropolitan Government and Tobu District Park Office, etc.
8	Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.	Women-Oriented Initiatives ⇒No  Youth-Oriented Initiatives ⇒Yes We visited the site to improve the technology and ensure it will be handed down.
9	Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.	Nothing in particular
10	What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.	<ul style="list-style-type: none"> <li>· Thorough safety training for site supervisors</li> <li>· Thorough sharing and training of safety matters for subcontractors</li> <li>· Strengthening communication skills between site supervisors and subcontractors</li> </ul>
11	Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.	Since the work was related to the Olympic Games, there was a lot of importance placed on coordinating with external organizations, budget, construction period, and so forth as we proceeded with the project.

6-3. Construction Project Name: Construction of the Yumenoshima Park Archery Field Facilities

Construction site: Yumenoshima 2-chome, Koto-ku, Tokyo

Client: Olympic Games and Paralympic Games Venue Developing Office, Construction Section, Tobu

District Park Office, The Bureau of Construction, Tokyo Metropolitan Government

Designer: Kei Design Institute Co., Ltd.

Contractor: NOEMA Engineering Co., Ltd.

Construction period: July 20, 2018 to February 15, 2019

1	Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.	⇒No
2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	⇒No
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	⇒No
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	⇒No
5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	If a contractor's technical skills are low, then their knowledge and ability regarding health and safety are often low as well. By carefully examining the content related to health and safety such as temporary design drawings during the design stage and attaching materials related to health and safety matters such as temporary design drawings as reference drawings at the time of ordering, the quality of effort being made toward safety consideration can be ensured to be at a certain level, which will in turn greatly improve the safety of the construction.

6	Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)	Nothing in particular
7	Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.	⇒Yes Construction safety patrols by the Bureau of Construction, Tokyo Metropolitan Government and Tobu District Park Office, etc.
8	Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.	Women-Oriented Initiatives ⇒No  Youth-Oriented Initiatives ⇒Yes We visited the site to improve the technology and ensure it will be handed down.
9	Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.	Nothing in particular
10	What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.	· Ensuring an appropriate construction period Most of the important factors of construction depend on whether the construction period is appropriate, such as safety, quality, and cost. Since the construction period for projects for events like the Olympic and Paralympic Games, is shorter, it is best that the process flow of planning, ordering, design and construction is systematically advanced in a manner that ensures there is no time strain in the construction work when the baton is finally passed to that stage. Also, doing so is the best way to prevent occupational accidents.
11	Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.	The time pressure was immense. In addition, there were many requests to make study reports particular to the Olympic and Paralympic Games project, certain materials had to be used, etc. There was no end to the hassles, difficulties, and workload.

6-4. Construction Project Name: Preparation of the Yumenoshima Park Archery Field Facilities

Construction site: Yumenoshima 2-chome, Koto-ku, Tokyo

Client: Olympic Games and Paralympic Games Venue Developing Office, Construction Section, Tobu

District Park Office, The Bureau of Construction, Tokyo Metropolitan Government

Designer: Kei Design Institute Co., Ltd.

Contractor: Seibu Construction Co., Ltd, and Yokota Construction Co., Ltd. Joint Venture

Construction period: August 3, 2018 to February 28, 2019

1	Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.	⇒No
2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	⇒No
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	⇒No
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	Nothing in particular
5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	If the construction method is the kind that can result in danger, then health and safety will be improved by eliminating such risks in the design stage.

6	Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)	Nothing in particular
7	Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.	⇒Yes Construction safety patrols by the Bureau of Construction, Tokyo Metropolitan Government and Tobu District Park Office, etc.
8	Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.	Women-Oriented Initiatives ⇒No  Youth-Oriented Initiatives ⇒Yes We visited the site to improve the technology and ensure it will be handed down.
9	Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.	Nothing in particular
10	What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.	<ul style="list-style-type: none"> <li>· Thorough safety training for site supervisors</li> <li>· Thorough sharing and training of safety matters for subcontractors</li> <li>· Strengthening communication skills between site supervisors and subcontractors</li> </ul>
11	Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.	Since the work was related to the Olympic Games, there was a lot of importance placed on coordinating with external organizations, budget, construction period, and so forth as we proceeded with the project.

6-5. Construction Project Name: Ground Construction for Yumenoshima Park

Client: Olympic Games and Paralympic Games Venue Developing Office, Construction Section, Tobu District Park Office, The Bureau of Construction, Tokyo Metropolitan Government

Designer: Tokyo Metropolitan Government official (directly managed design)

Contractor: Ogawa Zoen

Construction period: December 25, 2015 to March 7, 2016

1	Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.	⇒No
2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	⇒No
3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	⇒No
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	Nothing in particular
5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	If the construction method is the kind that can result in danger, then health and safety will be improved by eliminating such risks in the design stage.



6	Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)	Nothing in particular
7	Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.	⇒Yes Construction safety patrols by the Bureau of Construction, Tokyo Metropolitan Government and Tobu District Park Office, etc.
8	Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.	Women-Oriented Initiatives ⇒No  Youth-Oriented Initiatives ⇒Yes We visited the site to improve the technology and ensure it will be handed down.
9	Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.	Nothing in particular
10	What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.	<ul style="list-style-type: none"> <li>• Thorough safety training for site supervisors</li> <li>• Thorough sharing and training of safety matters for subcontractors</li> <li>• Strengthening communication skills between site supervisors and subcontractors</li> </ul>
11	Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.	Since the work was related to the Olympic Games, there was a lot of importance placed on coordinating with external organizations, budget, construction period, and so forth as we proceeded with the project.

7. Asaka Shooting Range (JGSDF Asaka Training Field)

Construction Project Name: Tokyo Olympic and Paralympic Games Temporary Overlay Development  
(Part 6) Asaka Shooting Range

Construction site: Niizuka, Niza City, Saitama Prefecture and others

Client: The Tokyo Organising Committee of the Olympic and Paralympic Games

Designer: NES Overlay Ltd.


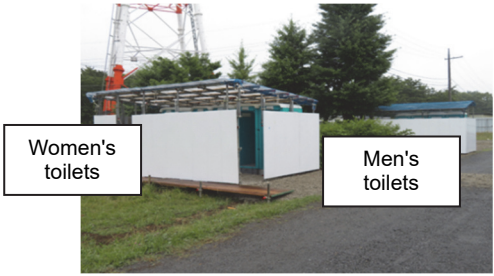
Contractor: NES Overlay Ltd.


Construction period: January 21, 2019 to March 31, 2021 (Construction suspended: June 1, 2020 to December 13, 2020)

1	Did the Client or other involved party conduct risk assessments or take any other steps during the design stage or review hazards that must be considered during construction to reduce the risk of occupational accidents? Did the owner establish any other systems or measures? If yes, please note the specifics.	<p>⇒Yes</p> <p>(Design stage)</p> <ul style="list-style-type: none"> <li>· We took advantage of the features of the design-build method to make sure that safety was fully coordinated with the construction contractor from the implementation design stage and that the plan was fully coordinated.</li> </ul> <p>(Other initiatives)</p> <ul style="list-style-type: none"> <li>· During the construction stage, in addition to the construction of temporary infrastructure such as prefabricated buildings and tents for operation, seats for spectators, and competition space, various constructions such as bringing in and installing equipment necessary for operation were planned, and we were able to perform different construction operations side by side to each other. Safety management and instructions were implemented by contractors as necessary to prevent accidents, including needed supervision and instructions for the various construction workers entering the construction site.</li> <li>· We established contact procedures to quickly ascertain accurate information and to respond appropriately in the event of an accident. We clarified the contact system within the Organising Committee, created a reporting form, and established system for confirming recurrence prevention measures.</li> <li>· We established a safety patrol system appropriate to our role as a client. We directly checked the work clothing, protective equipment, work environment and so forth and construction organization documents, as well, at the construction site.</li> </ul>
2	Was BIM/CIM used during the design and/or construction stages? If so, please provide examples of how the use of BIM/CIM contributed to health and safety during construction.	<p>⇒No</p>

3	As the Client, are there any hazards you wish the designer had considered during the design stage? If yes, what hazards do you wish had been considered?	<p>⇒No</p> <ul style="list-style-type: none"> <li>• Since the representative company of the contractor joint venture was a foreign company and English was often used in the implementation design drawings and study materials, there was a language barrier. For example, when a Japanese construction company of the joint venture created a construction drawing or construction plan, the sharing of study and information related to safe work procedures often did not go smoothly.</li> <li>• At the construction site, we asked the contractor to arrange for an interpreter capable of construction technical terms, and had them translate pertinent documents as well as provide interpretation at the site in an effort to prevent occupational accidents.</li> </ul>
4	Was the issue of reducing possible hazards during construction taken into consideration during the design stage? For example, did the Client and designer meet or otherwise coordinate on this issue? In the case of an inclusive order for both design and construction or ECI (early contractor involvement) or other contract, did the Client, designer, and Contractor hold meetings or otherwise coordinate from the initial design stage? If so, what type of issues did this coordination focus on?	<p>(Design to reduce risk, meetings between related parties, etc.)</p> <ul style="list-style-type: none"> <li>• During the design stage, we, the client, took advantage of the benefits of the design-build method, held regular meetings every two weeks with the designers, contractors, subcontractors, and consultants of the contractor joint venture to ensure communication and coordination, and proceeded with the implementation design by utilizing the collective knowledge of construction and manufacturing to reduce risks.</li> </ul> <p>(Content of meetings)</p> <ul style="list-style-type: none"> <li>• During the regular meetings, workability and safety considerations were studied to reduce the risk during construction by taking advantage of the benefits of the established systems and structures of the contractor and maximizing the use of design that was already familiar to the construction workers.</li> </ul>
5	As the client, do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction? Please note your opinion regarding this question.	<ul style="list-style-type: none"> <li>• Actively studying ways to reduce or eliminate construction related risks during the design stage, such as investigating the unit size of steel frame members by backcasting from the transportation and assembly plan for steel frame members is an effective way to improve health and safety during the construction period.</li> </ul>

6	<p>Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages. In these cases, please note the stage at which these methods and elements were adopted. (Give examples of constructions and methods that saved labor or mechanized process, including construction cases and new technologies.)</p>	<p>(Use of risk assessment to select safer construction methods, and evaluation and improvement of risk reduction measures)</p> <ul style="list-style-type: none"> <li>• We used a danger/harm factor identification sheet to categorize the 12 types of construction work (pile work, truss assembly work, membrane structure work, formwork, reinforcement bar work, etc.) to be used during the construction stage for the temporary venue construction to identify those that posed risks of danger or harm</li> <li>• We comprehensively studied risk reduction measures during the planning stage, such as ways to eliminate or modify dangerous work. (By selection of construction method, etc.)</li> <li>• We used the risk management sheet to classify the items for the temporary venue construction, rig and de-rig frame, loading and unloading, construction machinery, cranes and tools, rig and de-rig soft goods, trusses, rig and de-rig turrets and pile construction.</li> <li>• Our plan was to be organized in a way to perform completely different tasks such as installing unit houses, installing security fences, wiring, and developing fields and equipment for competitions. We believe that the staging and coordination of work processes out of consideration for the order of the construction was an important factor for safety management. In addition, in regard to construction projects placed by other departments of the Organising Committee, we carried out process coordination among the contractors with consideration to information coordination with the contractor so that the construction could be carried out safely.</li> </ul>
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<p>7</p>	<p>Did any measures focus on preventing the falls, collisions, or public injury that often occur during construction work? If so, please note the measures that were taken.</p>	<p>⇒Yes</p> <p>(Prevention of falls and collisions)</p> <ul style="list-style-type: none"> <li>• We were able to use a groundwork approach for the ballistic net steel truss assembly work at the clay target shooting site, whereby reducing the amount of aerial work needed.</li> <li>• All aerial work was kept at the minimum required and made safer using elevated platforms or aerial work platform vehicles.</li> <li>• We trained workers engaged in aerial work such as temporary truss assembly work to use harness-type safety belts</li> <li>• Installed lifting equipment with handrails for height differences of 1.5 meter or more (as a rule, we also installed even if less than 1.5 meter in height difference)</li> </ul>  <p>(Prevention of public disasters)</p> <ul style="list-style-type: none"> <li>• We coordinated the loading and unloading of construction vehicles and assigned security guards to the gate to prevent public disasters with third parties.</li> </ul>
<p>8</p>	<p>Did any measures focus on ensuring a safe, secure, and rewarding worksite for women and younger workers? If so, please note the measures that were taken.</p>	<p>Women-Oriented Initiatives</p> <p>⇒Yes</p> <ul style="list-style-type: none"> <li>• We installed women's toilets.</li> <li>• Over 50% of the Western-style toilets installed were for female construction workers.</li> </ul>  <p>Youth-Oriented Initiatives</p> <p>⇒Yes</p>

9	<p>Please note any other health and safety measures taken during construction on this project that seem to you, as the client, unique.</p>	<p>(Health management of construction workers such as heat stroke prevention and mental health measures)</p> <ul style="list-style-type: none"> <li>• The work area for constructing the piles at the clay target shooting site was far from the worker rest area and there was no shade at all, so we installed a tent and cooler box near the work area to allow for appropriate breaks and hydration.</li> <li>• We installed water servers and refrigerators in various places such as construction site offices, meeting rooms, and worker stations. We also installed an ice machine in the worker rest area.</li> </ul>  <p>(Measures for foreigners involved in the construction work)</p> <ul style="list-style-type: none"> <li>• Over 50% of the Western-style toilets installed were for foreign construction workers.</li> </ul>
10	<p>What occupational accident prevention measures do you wish to see the construction industry retain in the future? These do not need to be examples of measures actually taken. Please note your opinion as a client ordering construction.</p>	<ul style="list-style-type: none"> <li>• If the contractor joint venture was a foreign company, we needed to carefully check whether foreign workers had a Japanese license for heavy equipment such as forklifts and had attended the corresponding training. For example, a holder of a forklift license issued by another country could mistakenly think they do not have to take forklift training in Japan. At this site, we confirmed worker qualifications in advance to ensure foreign workers had the proper licenses and training required in Japan.</li> </ul>
11	<p>Please note your impressions of the construction of facilities for the Olympic and Paralympic Games.</p>	<ul style="list-style-type: none"> <li>• Because the contractor was a foreign company and there were cultural differences, there were some cases where communication was not successful, resulting in partial confusion.</li> <li>• In the future when working with foreign companies such as designers, contractors, and consultants, for such construction projects, it is necessary to carefully design the systems in advance to ensure that the ordering method and contract form can be properly used.</li> </ul>

### 3.4 Traditional discovery meeting surveys

In addition to the written questionnaires, we conducted traditional discovery meeting surveys with the businesses. These traditional discovery meeting surveys confirmed details such as items that could be treated as legacy items with the clients and contractors based on the content of the written questionnaires that had already been received.

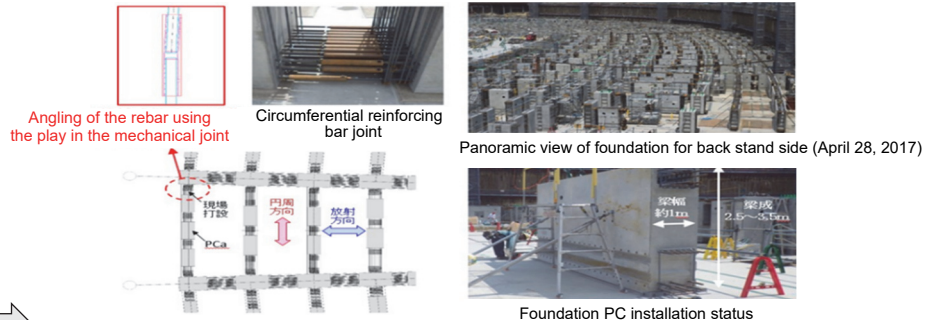
#### (1) National Stadium

Implementation outline			
Business of topic	New National Stadium Development Project	Discovery date	Friday, November 26, 2021
Persons involved	Client: Japan Sport Council Contractor: Tokyo Branch, Taisei Corporation		

**Q** According to the responses, consideration for workability and safety (elimination and reduction of occupational accident risks) based on construction method proposals from the construction team were incorporated during the design stage based on knowledge of construction work (construction technology investigations). In addition, those opinions were proactively incorporated into the actual design. Can you share more details?

- A**
- (1) Parts that use concentric circles and shared cross-sections and that avoid complicated shapes and details were adopted for all kinds of materials, and in order to proceed with construction in the circumferential direction, we always worked with the same shape, same span, same quantity, and symmetry. This made it possible to use the equipment repeatedly and created a learning effect which facilitated the processes, and improved quality and safety.
  - (2) By incorporating a precast (PC) design for most of the RC and SRC structural parts and receiving approval from the Minister, precast members including foundations could be manufactured at an early stage, thereby significantly reducing the risk of various accidents and disasters as well as saving labor during site frame construction work.

Conversion to precasting (PC) for foundations: Reinforcement of bar joints in the circumferential direction of the foundation beams



1

**Contractor comments**

There were about 3,500 pieces of foundation beams, and since they were oval, we constructed them at an angle. By using PC for the foundation beams, we were able to decrease the number of workers on site, which also reduced the amount of health and safety management required by the prime contractor.

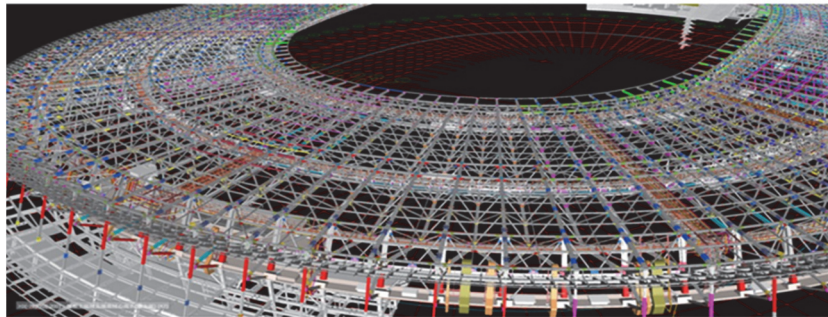
- (3) By anticipating on-site installation using unitization of roof members, we were able to incorporate the member composition, cross section, fit, and so forth into the design after simulating how to build the unit. This made it possible to significantly reduce aerial work. Also, we devised a way to easily join the units, thereby significantly reducing the risk of falls and accidents resulting from falling objects.



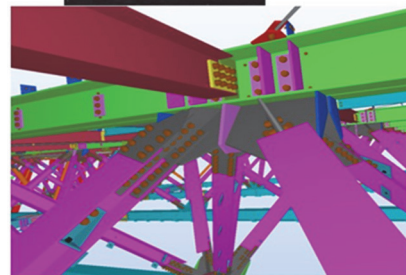
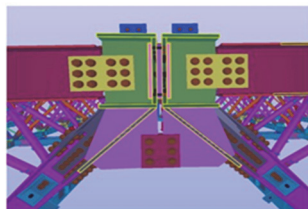
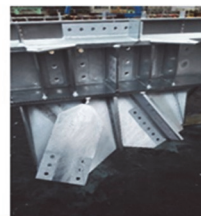


Q According to the responses regarding the use of BIM and CIM, you used drawings of the attributes and checked for inconsistencies. Further, virtual reality technology was used to visualize the design content. Can you share more details?

A For example, for the roof construction, by studying construction using BIM for both the building and the equipment, we were able to improve the accuracy of planning for three-dimensional and complicated shapes, thereby identifying issues (workability of joints and points of interference) that we wouldn't normally be able to see using two dimensions. This greatly contributed to consensus-building among the various specialized contractor parties.



Fitting of upper chord material and lattice material



2

Contractor comments

We mainly used BIM for the roof. Since it was an oval shape cantilever overhanging about 60 meters, its construction was particularly difficult, so BIM proved very useful. We verified that the joints fit, confirmed the mounting dimensions, and checked whether the work could be done safely. In addition, this made it possible to study the fit and mounting dimensions of roofs, catwalks used for maintenance, competition lighting, audio speakers, and so on while we were still in the design stage. The work could be visualized, which in turn led to improvement in productivity and safety. At the same time, this also helped in our management of labor productivity per unit, man-hours, and construction period.



Q In response to the question, "Do you think that taking the elimination or reduction of risks into consideration from the design stage leads to better health and safety during construction?" you answered regarding the importance of creating a design drawing that incorporates health and safety measures into consideration at the design stage. Can you share specific initiatives that you employed in this regard?

A

Precast foundation beam: Points to keep in mind during the design process

Angled rebar using the space in the mechanical joint

Joined reinforcing bars in the circumferential direction (grout filling type)

Placed a mechanical joint at the end of each foundation beam

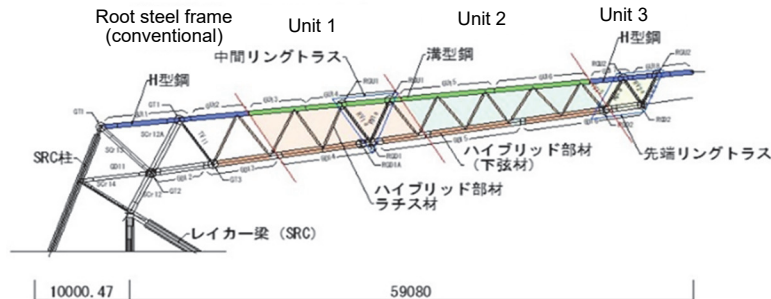
Cross section of precast foundation beam  
Standardized the cross section of the foundation beam as much as possible

- ⇒ Studied the details of the reinforcement arrangement in the crossing part with the three types of beam width and three types of beam height.
- (2) Used a mechanical joint (class A) at the end of each foundation beam  
⇒ Designed so as to not cause yield hinge on the foundation beam
- (3) Method for connecting the foundation beam in the circumferential direction  
⇒ Used the space in the mechanical joint to angle the reinforcing bar

3

Contractor comments  
Since we were able to study the conversion to foundation PC during the design stage, we were able to work more safely than had we starting the study once site activities were already underway.

Roof composition



Q According to the responses, meetings with the clients, designers and contractors, as well as specialized subcommittees were held regularly in the 1st phase of the contract (basic design, implementation design work, construction technology examination work). How often and regarding what topics were such regular meetings held?

A

- This project adopted the design-build method.
- During the design stage, task forces were held every one to two weeks between the design team members (architecture, structure, equipment) and construction and client team members.
  - The task force mainly worked to form consensus between the client, the designers, and the contractors on whether the design work and construction technology study work and open recruitment conditions were suitable. In such meetings, the topic of "design of buildings, etc., that reduce the risk anticipated during construction" was also discussed between the parties, studying design and the construction technology, and the results thereof were reflected in the design documents.
- (1) The following are examples of what was confirmed between design and construction parties:
  - (2) The design ensured safety by adopting a certain size and level for the communication hole in the foundation beam, whose beam height was about 2.5 to 4.5 meters, to secure the horizontal movement of workers during pit construction and to reduce the vertical movement including material transportation.
  - (3) Through unitization of the roof truss, we were able to greatly reduce aerial work by using a specification that could be installed during the groundwork stages such as walkways and equipment.
  - (4) We set the seismic load and wind load appropriately during the construction period and verified the structural safety during construction. We verified these items during the design stage, reflected the results in our design documents, and confirmed results using reports of the required level and so forth.

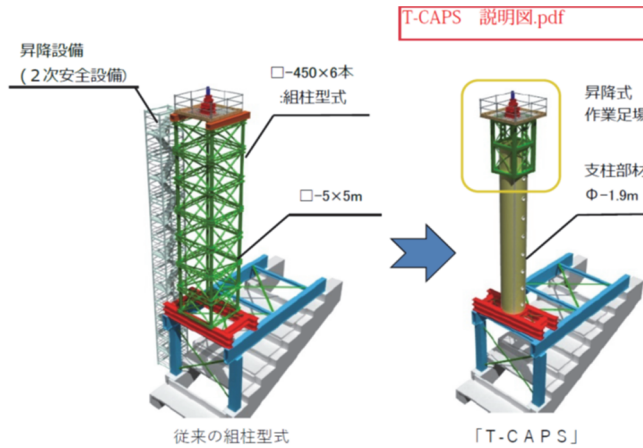
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Q Please note the construction methods used and key elements adopted, including the implementation of risk assessments, to eliminate or reduce work risks during the design and/or construction stages.

A [Construction stage]

1. Temporary support work for roof steel frames: Efficient assembly and disassembly of support work to reduce aerial work

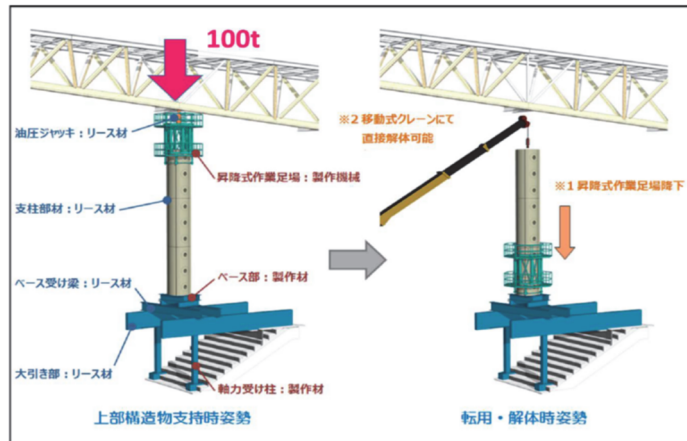
We developed a large-scale support using tower crane columns for the temporary support used in supporting the unit steel frame when assembling the unit steel frame for the stand roof.



Comparison of temporary support

5

We developed the Taisei-Climbing Adjustable Post System (T-CAPS), which uses the mast of a general-purpose large tower crane (JCC-400H) as the main component, and adopted it for construction. Using T-CAPS, the work scaffolding that could be raised and lowered along the mast support and the raising and lowering equipment in the mast eliminated the need to install safety equipment that needed to be attached. In addition, the descent of the elevating work scaffolding enabled direct disassembly by inserting a crane under the roof, dramatically improving the efficiency and safety of assembly and disassembly work.



Support system using T-CAPS and its components and structures and its disassembled process

Contractor comments

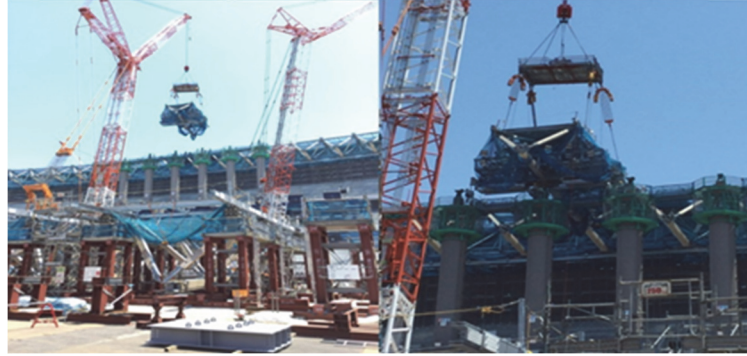
Since it was possible to consider temporary support for assembling the large roof from the time of design, it was no longer necessary to open an opening for the support in the step floor of the spectators' seats, and the work under the step floor could be done in parallel with the large roof assembly.

Q Did any measures focus on preventing falls, collisions, or public injury that often occur during construction work?

A [Design stage]

1. Unitization of large roof: Reduction of aerial work risk

The steel frame for the roof was divided into three parts, assembled on the ground (including inspection corridors and lighting units), and then lifted into place.

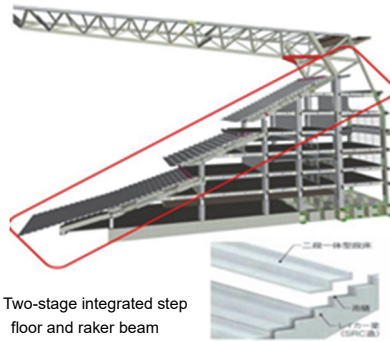


Contractor comments

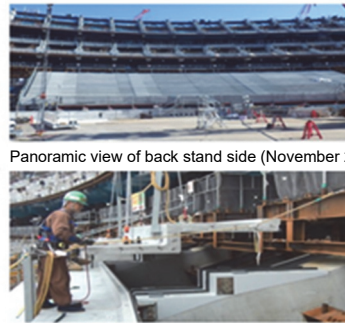
The roof was composed of a total of 108 units, and since the entire roof had an oval shape and a convex shape, only one pair of facing units had the same shape. Audio speakers were also attached to the roof unit during the groundwork stage and were lifted into place by crane. BIM was also used for the surveying technology, and the last unit was put in while adjusting the position including the height.

2. Precasting the stadium frame: Reducing the risk by improving the efficiency of site work  
Foundation, stand deck, outer circumference SRC pillar (SRC), etc.

- Step floor precasting (PC): Shorter construction period by adopting two-stage integrated step floor slabs



Two-stage integrated step floor and raker beam



Panoramic view of back stand side (November 21, 2017)

Status of the two-stage integrated PCa installation

6

[Construction stage]

Large roof unit: Reduction of aerial work risk

- Photo of status of the full-scale construction verification construction



Contractor comments

A full-scale mockup of a large roof was created for two spans, 10 months before the roof was assembled. The mockup was assembled according to the actual work procedures, and feedback was given on improvements, which in turn led to design revisions.



Q What can you share about the “Jingu Komachi” and “Rikochalle” initiatives for women?

7 A Riko Challenge 2018 was held at the New National Stadium Development Project  
Taisei Corporation co-sponsored the “Rikochalle (Riko Challenge) Summer of 2018: Let's experience science and engineering work!” with the Cabinet Office, the Ministry of Education, Culture, Sports, Science and Technology, and Keidanren (Japan Business Federation) to support female students who were interested in science and engineering fields to visualize their future selves confidently and choose their career path. Part of this activity included an event called “Let's experience! Architecture work and the women of science and engineering at the New National Stadium Maintenance Project site,” which was held at the New National Stadium Maintenance Project site on August 27 and involved 51 female students from the 4th grade of elementary school to the 3rd grade of high school.

Q Can you share any photos or related items from the "Working with Liveliness" photo panel, "The Worker Commendation," and the young leader commendation that was awarded for the purpose of training young people?

8 A



Director of the Tokyo Labor Bureau observing the bulletin board showing photographs of workers



Director of the Tokyo Labor Bureau attending the Paralympic support center donation commendation as part of the foreman's association activities



Contractor comments

The photo panels of the workers were very popular among them, as many noted that they had never even shown such photos of themselves on the job to their families. The photos helped to increase motivation.

Q It seems that you formed a comfortable working environment, such as the establishment of a health counseling room with a resident nurse. Can you share more about this through photos and other?

A



9



Contractor comments

We had as many as about 2,800 workers a day, for a total number of about 1.5 million site entries by workers. We had a health counseling room with a resident nurse on site in consultation with an industrial physician to manage vital signs (pulse, blood pressure, etc.). As a measure against heat stroke, we set up water supply stations at various sites, and up to about 2,800 liters of drinking water was prepared per day. In addition to roasted barley tea, we prepared light, normal, and strong sports drinks. We also prepared break rooms in air-conditioned mobile vehicles. We installed a shower room, washing machine, dryer, and so forth for workers who use public transportation. Also, we trained approximately 350 workers as paramedics, and one of our major achievements was that of raising awareness of safety, including emergency response.



(2) Ariake Gymnastics Centre

Implementation outline			
Business of topic	New Construction of the Ariake Gymnastics Centre	Discovery date	Thursday, January 6, 2022
Persons involved	Client: The Tokyo Organising Committee of the Olympic and Paralympic Games		

1 Q According to the technical proposal at the time of the order, a lift-up method was employed for beam construction to reduce aerial work. Can you elaborate using illustrations and photos?

A Here are photos of the lift-up construction in progress and photos of the wooden arches, girders, and beams.

リフトアップ計画 Wood Arch Lift up



2 Q It is my understanding that the contractors actively participated in the regular meetings during the implementation design phase to ensure the design incorporated considerations for construction processes. Can you elaborate using illustrations and photos?

A The regular meetings were held about every week, sometimes once every two weeks, and included the clients, designers, and contractors. Adopting a mobile scaffolding is the one of the examples of how these meetings helped to meet the construction deadline.

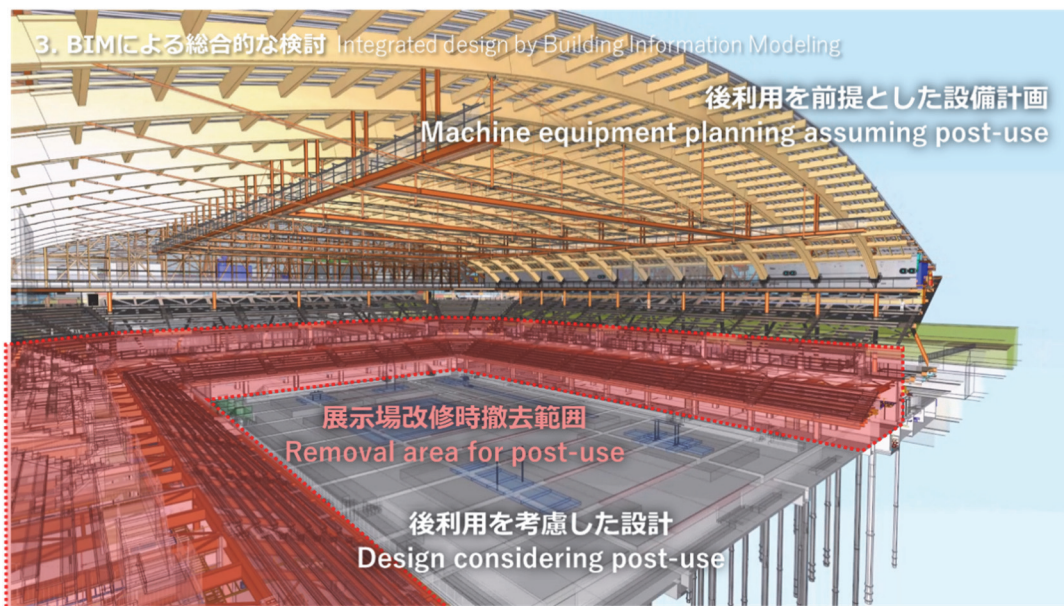
工期遵守のための工夫 移動足場によるサイクル工程 Cycle schedule using Moving Temporary Scaffolding

耐火被覆、ALC、天井仕上用移動足場  
Moving Temporary Scaffolding for fire protect work and ALC installation



3 Q It is my understanding that BIM was used in anticipation of remodeling into an exhibition hall for use after the games. Can you elaborate using documents and other materials?

A Here you can find the BIM image. (The part shaded in red in the photo below is the audience seating part to be removed to make it an exhibition hall.)





#### 4. Occupational accident prevention measures that should be handed down as legacy measures

The Council for Health and Safety Measures for the Construction of Facilities for the Tokyo 2020 Olympic and Paralympic Games set a Basic Policy for Health and Safety Measures for the Construction of Facilities for the Tokyo 2020 Olympic and Paralympic Games. The main items of the basic policy are as follows:

- (1) Health and safety measures by clients: Health and safety measures should start at the ordering and design stage so that serious risks such as occupational and public accidents can be better addressed.
- (2) Promotion of risk assessment and so forth: Drastic risk reduction measures including selection of construction method itself, thorough risk assessment, and detailed health and safety training for construction workers.
- (3) Thorough prevention of fall accidents: Focusing on the prevention of fall accidents and public disasters, which are common in construction work
- (4) Creating more attractive construction sites: Creating construction sites where women and young people can work safely, securely, and with satisfaction

In the past, the role of occupational health and safety oversight during construction has been mostly played by contractors, but the above basic policy states that the role should not be only for contractors but also for clients and designers. The role they played was very big.

On the other hand, as a part of the project for the prevention of occupational accidents in response to the demand for construction related to the project on occupational accident prevention measures implemented for the construction demand related to the Tokyo 2020 Olympic and Paralympic Games, which was entrusted to the Japan Construction Occupational Safety and Health Association by the Ministry of Health, Labour and Welfare, this report summarizes the Study of Occupational Accident Prevention Measures That Should Be Handed Down as Legacy Measures. Due to COVID-19 this year again, we were forced to employ a document review format for our committee meeting rather than the usual face-to-face format.

Despite this situation, we were able to conduct the survey based on the form of questionnaire prepared in accordance with the above basic policy in order to collect best practices of occupational accident prevention measures that should be passed on as a legacy from the construction projects related to the Tokyo 2020 Olympic and Paralympic Games. In addition, we conducted interviews with clients and other main parties to enable us to obtain more useful good examples, in addition to the responses to the questionnaire. In this report, "occupational accident prevention measures that should be handed down as legacy measures " are listed below based on the collected case survey forms and the results of on-site interviews.



(1) Health and safety measures by clients:

- In order to effectively utilize the facility as a legacy, we will continue to upgrade the design and construction and BIM information by using BIM from the design stage, with a view to renovating it not only for design and construction but also for versatility after the Olympic and Paralympic Games.
- Thanks to the Design-Build used, on-site verifications that included the clients, designers, and contractors were held starting in the design stage, and regular meetings and task forces were held once a week or every two weeks. During those meetings, the construction period, cost, and safety were fully coordinated with the contractor starting from the implementation of the design stage. Further, information on places where congestion of construction works was expected, on the entry of third parties due to events, and so forth was shared to help prevent accidents from happening.
- The most important thing in preventing occupational accidents is to make sure the construction period is appropriate. Ensuring an appropriate construction period

Most of the important factors of construction depend on whether the construction period is appropriate, such as safety, quality, and cost. Since the construction period for projects for events like the Olympic and Paralympic Games, is shorter, it is best that the process flow of planning, ordering, design and construction is systematically advanced in a manner that ensures there is no time strain in the construction work when the baton is finally passed to that stage. This approach was the best occupational accident prevention measure in this worksite.

- In the future when working with foreign companies as a designers, contractors, consultants, and so forth for such construction projects, it will be necessary to carefully design the systems in advance to ensure that the ordering method and contract form can be properly realized.

(2) Promotion of risk assessment and so forth:

- Frontloading, which examines the prevention of occupational accidents at construction sites starting in the design stage, is effective as an occupational accident prevention measure.
- In a stadium with 3,500 pieces of foundation beams, precasting was able to reduce the amount of labor and made the work of joining components safer. In addition, by reducing man-hours, we were also able to reduce the amount of health and safety management needed.
- At the stadium, where BIM was used, the roof was the main focus, though not the entire area. BIM was useful because there was a cantilever with a 60m overhang, it was oval, and very difficult to construct. Using BIM made it possible to see how the drawings fit, check the dimensions, and study whether the work could be done safely or not.
- In order to reduce the risk anticipated during construction, materials of various survey results (boring survey, soil analysis results, etc.) were presented to the contractor starting in the design stage and reflected in the design conditions for structural calculations for the building. The contractor also checked the site and tried to reduce the risk during construction by confirming whether the design as specified

could be constructed at this site without danger. Specifically, starting in the design stage, we anticipated the risks pertaining to the raised part of the H-shaped steel frame built in the coastal area and the frame of the H-shaped structure for installing the video board.

- The design drawing for the closing dike, floodgate, and the attachment part on the north side of the eastern cutoff were 3D modeled (3D-CAD), which was useful for interference checks during the design stage and construction planning during the construction stage. Deepening the understanding of the shape of the structure in the construction plan also contributed to the health and safety of the project. In addition, during the implementation design stage, we decided to reexamine the types of work that involved diving to reduce the associated risks, and to revise the temporary support work (number of girder steps) associated with the construction of the floodgate.
- Actively studying ways to reduce or eliminate construction related risks during the design stage, such as investigating the unit size of steel frame members by working backwards from the transportation and assembly plan for steel frame members was an effective way to improve health and safety during the construction period.
- We used a danger/harm factor identification sheet to categorize the 12 types of construction work (pile work, truss assembly work, membrane structure work, formwork, reinforcement bar work, etc.) to be used during the construction stage for the temporary venue construction to identify those that posed risks of danger or harm.
- Our plan was to be organised in a way to perform completely different tasks such as installing unit houses, installing security fences, wiring, and developing fields and equipment for competitions. We believe that the staging and coordination of work processes out of consideration for the order of the construction was an important factor for safety management. In addition, in regard to construction projects placed by other departments of the Organising Committee, we carried out process coordination among the contractors with consideration to information coordination with the contractor so that the construction could be carried out safely.

(3) Thorough prevention of fall accidents:

- In the technical proposals at the time we made our orders, we adopted a lift-up method that reduced the amount of aerial work with beams. This reduced aerial work and shortened the construction period.
- In order to reduce the risk of workers falling during construction, the roof shape had a simple one-sided flow to improve workability and was designed with safety in mind.
- All aerial work was kept at the minimum required and the risk of collisions and falls was reduced by using elevated platforms and aerial work platform vehicles.

(4) Creating more attractive construction sites:

- The initiative to post photos of workers sincerely engaged in their work at the construction site and present those photos to the workers and their families was very well received by workers and helped to increase motivation. Many workers provided positive feedback about how this was the first time they had ever shared photos of themselves on the job with their family.
- We installed women-only rest areas and nap rooms. Also, women's social gatherings between JVs (Joint Ventures) of different industries were implemented to create a comfortable working environment for women.
- The young foremen of the prime contractor and subcontractors participated in the monthly foreman's meeting, in which communication with the younger people was proactively supported by giving them an opportunity to feel free to consult about problems in the site, workplace improvement, etc.
- In order to keep aware of everything going on at the entire site, we entrusted the inspection work and reporting to young workers.
- Many staff members worked hard to achieve a single goal with a strong sense of mission to maintain the venue for the Games. It was a very busy but rewarding experience.
- Nurses were stationed at the site and a health counseling room was set up. We consulted with an occupational physician to set up the health counseling room.
- As a measure against heat stroke, water supply stations were set up at various sites and up to about 2,800 liters of drinking water was prepared per day. In addition, we provided light, normal, and strong taste sports drinks as well as roasted barley tea. We also had an air-conditioned mobile rest area (minibus) that moved around the site.
- We trained approximately 350 workers as paramedics. This was done more as a safety awareness initiative than out of a concern that we would really need that many people trained as paramedics, and it proved to be effective in increasing safety awareness.

In this way, it is clear that we were able not only to improve health and safety efforts in the construction stage, but also to expand the health and safety improvement efforts to the clients and designers in the early stages of the project. Such efforts contributed not only to improving health and safety, but also making the design more advanced, making the construction more streamlined and efficient, shortening the overall construction period, and increasing opportunities for women and young people to actively enter the construction industry.

The Tokyo 2020 Olympic and Paralympic Games came to a successful finish, and so it is our hope that these efforts will be retained as legacy efforts and measures that the entire Japanese construction industry can apply going forward, not just for special construction projects like those for the Tokyo 2020 Olympic and Paralympic Games.