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Hotel Okura Tokyo

Session 5: Challenge of Conservation of Active Industrial Heritage Site

Chairperson: Patrick Martin (Department of Social Sciences, Michigan Technological University, United States)

(Martin) Good morning and welcome to Session 5. I am happy to see so many people here this morning. It is very impressive. This whole event is impressive, I must say.

I want to get started so that we have time to hear the messages from these wonderful speakers. We are going to hold strong to our schedule. Each will have 25 minutes and five minutes for questions immediately adjacent to each of the talks, not at the end.

Our first speaker today is Takashi Nanba, who is a Deputy Governor of Shizuoka Prefecture and a visiting professor at Kyoto University, and, and I understand, retired from the cabinet secretariat. His speech today is 'Conservation Challenge of Miike Port under the Port Law'. With that, Takashi.

Conservation Challenge of Miike Port under the Port Law

Takashi Nanba (Deputy Governor, Shizuoka Prefecture, Japan)

Good morning, ladies and gentlemen. Let me start. The topic given to me is 'Challenge to Protect and Preserve the Heritage Value of the Miike Port Under the Port and Harbor Act'. Thank you for the introduction. I am currently the Vice Governor of the Shizuoka Prefecture government, but why am I talking about Miike?

[#: indicates slide number]

#2

First let me advertise Shizuoka Prefecture. I am the Vice Governor, because one of the sites is this reverberatory furnace of Nirayama, which is included. This is a reverberatory furnace in Nirayama. I am really strongly praying that this would be also inscribed. Then Mount Fuji, two days ago, I think you visited, but this is also already designate as cultural world heritage site. Our prefecture Shizuoka is closely related to the world heritage.

#3

I am not talking about my prefecture Shizuoka. I am retired, and I used to be the Deputy Minister for Technical Affairs of MLIT. Today's topic is relevant to my previous post as a Deputy Minister for MLIT, but now I am involved in the prefecture government, and I am quite well versed in that matter as well, so I would talk about that as my main topic today.

#4

As an active site or asset, what is value of Miike Port? That is my main topic today. Of course,

the coal export was the important base during latter part of the Meiji period when Japan industrialized and, the currency by exporting coal, and then make enough capital to make capital investment. The coal industry was really important. Miike port had the coal mine very close, and then there was the railway built to directly transport the coal to be sent to the port for the large vessels for export. The port was established in 1908.

There was shallow water Ariake Bay, and in order to overcome the problem of accumulation of silt and sand, the long groin was built to prevent erosion, and there is a five-meter big tidal difference. To solve that problem, of course, the vessels had to wait inside the port, so there is a special large lock-gate built in the dock facility. This is a well planned construction of the port, and you can see the shape of the port. It is like shape of the hummingbird flying. It is called 'hummingbird shape'. This unique shape of the hummingbird is still kept as a port, and it is a still active port utilized as an important economic base to support the Japan and regional economy.

#5

Miike port is unique because the property ownership has a unique relationship. Initially, it was built and owned by a private company. However, later on according to the Port and Harbor Act in 1951, this port was designated as a major port. But until 1998, the wharfs and then the piers were exclusive used by a private company. Public use of the pier was only started in 1998, so that is background history. The overall arrangement of the port is, of course, done by prefecture of Fukuoka, but independent individual facilities are owned by different owners.

Water areas like this kind of canal and water areas are owned and managed by MLIT, the national government and Fukuoka prefecture and Miike Port Logistics Company, a private company of logistics. That is a separate ownership and supervision and management jurisdictions. The owner of the pier, the wharf is Fukuoka Prefecture and Miike Port Logistic Company. Land ownership is split amongst different private companies; Omuta City government. That has a major impact upon the conservation management of heritage asset and its value.

#6

Now, let me turn to the OUV, which stands for Outstanding Universal Value. These are as follows. This is a unique shape, hummingbird shape port. It, as I said, has this kind of groin to control/check the sand impact. This is the river revetment or soil protection facility which reflects the Meiji era technology. To solve the problem of the big tidal difference, there is an inner port where the vessels wait. Then, there are locking gates, so those are locking gates.

Another feature is transportation system of the railroad that the coalmine and the port are directly linked, so we still keep and maintain those historical legacies. The other things are still operating. Unfortunately, the railway system no longer is operating. As an entire port, it is an active operating port contributing to the local economy and the global economy.

#7

Now, I would like to turn to talk about the unique features and how to maintain and conserve the value of the Miike port.

There are three important perspectives for conservation and management. We would like to, of course, protect and preserve the world heritage value, but to achieve that, the first point is how will the functions of Miike port be maintained as a main port in the future responding to the requests of the time?

The second, generally, private companies have to change in order to survive, but how will the actions of private companies be regulated to protect the value of the world heritage while private company need to change themselves as well as their facilities compete with others? We should never hinder the world heritage value, but so how can we regulate those companies whilst still maintaining the value?

The third point: the local governments are in charge of management of the port so that the views of the governor and mayor may greatly influence the development, application, and protection and preservation of Miike Port. The current mayor has a good understanding of this value of the world heritage, but maybe the new mayor might be elected or governor may be elected with a different view toward world heritage. Maybe, if the new mayor would give more priority to the economic activity rather than world heritage. The things will get totally different, so we have to try to make it sure that the world heritage value would be still protected.

#8

This is a detailed chart which shows the basic concept of methodology to protect and preserve the Miike Port as an economical infrastructure and still maintain its value as a world heritage property. Number one: of course, they have to protect the design and the value of the port, but that alone is not enough. The number one important area is space management to make appropriate use of the space of the entire port so that appropriate/proper regulations will be applied to the port. The second point is function management. For example, how can we maintain the logistics, the function, and then improve that function under this functional management? The third point is so called landscape management. Aside from the environment management now being entailed as well, you have to protect the landscape and environment, so that management is necessary. This is where the authenticity must be managed

By managing the whole thing, then this value as world heritage can be really maintained. We have to have a broad perspective in order to manage this port.

#9

What are the important points for conservation and management? This is a management point, and then so this is, of course, value judgment, and the right hand side is how to manage the port function in order to conserve the value. We have to have a flexible, effective and take speedy action as a basis of decision-making. Then, to manage and conserve the value, a deliberate and then conservative attitude is necessary. The y-axis shows the time change. As the time changes, the economy and then surrounding environment will change, so how can we conserve the value in this change? The conservation aspect will still be maintained.

It is intact, but operation might be different according to the changing times with the different demands, so the way operation should be changed flexibly, but how can we strike the balance between

those two and achieve harmony between operation and conservation? That is a crucial duty for us. One thing is that the port-related operators and operation, namely the private companies, should fully understand the value of the heritage. They should cooperate and understand in order to conserve the world heritage.

Conservation should be supported by the society and by the experts. By that, value will be protected. That alone in real practice cannot may be fully protected the value. Then you have to really have a good legal system to do proper management.

#10

Based upon that, we have basic legal system called the Port and Harbor Act system. What is the Port and Harbor Act? The definition that there is so-called major port stipulated, and according to the Article two, the major ports are designated. Miike Port was designated as a major port in 1951. For article 3-3, there is a port plan, the port management body of the major port shall formulate a plan for the development, utilization and conservation of the port.

The way the port should be is depicted by the Port and Harbor Act. This plan, actually, is the basis of decision making to decide whether the particular action is proper or not within the port. The port plan is drafted and then activity that will hinder the plan would never be allowed or approved.

Another important thing is related to central government's role. Of course, in case the port plan is not proper, then the national government can demand them to modify such plan.

#11-12

This is the summary.

As a legal system, we have this system of Port and Harbor Act, and it is quite effective. The first point in the Port Plan, which is a legal plan, the port management body can express the intention to improve the port toward the concerned persons and society by describing that it aims to protect and preserve the world heritage value in harmony with its operations. That is to say, the next page, actually, in your handout depicts the details.

Because of the legal stipulation that the port management authority actually declares their will to conserve toward the society as well as relevant parties, this Port and Harbor Act is quite often misunderstood. It is not a law for the development and construction of the port. That is the wrong interpretation of the provision, because this Port and Harbor Act is for the sake of the development, conservation, and management of the port. The port space should be properly managed, and that is the gist of this law, so the value as a world heritage should be protected and conserved under this purpose of the Port and Harbor Act. Therefore, by applying this legal system, it is possible to protect the world heritage value.

The second point is stipulated here. The port management body, the local government, can take enforcement measures in the whole space of the port, including regulations of land usage as a legal administrative act according to the port plan. It is not just hodgepodge or piecemeal approach. It is based upon the strong will to protect the port for the long term, so different enforcement activities can be also implemented by the port management authority.

The third point is that, when the port management body, local government, tries to formulate the

port plan which may lower the world heritage value due to the change of governor or mayor, the central government can request them to revise the plan to protect and preserve the world heritage value.

#13

This is very detailed chart, sorry about that. But please just look at the basic area. The central line shows the Miike Port CMP (Conservation Management Plan). Left hand side shows the entire government system for the conservation so that the cabinet office as well the different government authorities are involved in this system. The right hand side actually shows the different regulations by the Port and Harbor Act.

Specifically, for example, the private sector company or related companies, if they are engaged in the new development plan act, what will happen to them? This is the flow chart explaining them. Whether they are actually in compliance with this law is to be judged. If they complied with the law, then it is, yes, the new construction will be decided, but the Port Management Authority will receive the application from the company.

It is not private company to decide, but rather authority decides. If it is in compliance, then companies are given approval. If the judgment is made that it is not complying with the law, then that private company will have to revise the port plan. Then, the port management authority would actually decide to change the port plan, and so a new revised port plan is now drafted, then that is now submitted to the central government, MLIT. Then, there is are different organizations like the Transport Policy Council and relevant ministries and seek opinions and advices. Naturally. the government system will be referred to, and if that particular port plan is not appropriate, then hearing opinion, that arrow is a bit wrong, but anyway opinions are given, advice is now given.

If the particular port plan is not proper, then the minister of MLIT will request the port management authority of the particular prefecture to change the plan, so no inappropriate port plan would ever be adopted through this rigorous process applied. If the governor is elected or mayor is elected who would not give priority to the protection of value, or if the private company requests to make the change to the plan, no such plans were ever approved because they are enforced by the central government and other rigorous measures.

#14

This feeling is expressed. In 1858, Mr. Takuma Dan was born in Fukuoka in 1888. He became the General Manager of Miike Coal Mine Company. He was engaged in the construction of Miike Port, railway construction, and dredging of the Omuta River, and so on. His words are quoted “Coal mountains would never last forever. Once they are lost, currently affluent areas will return to wastelands again. This is why I have focused further on the construction of this port. Even without coal, business can be developed with coal brought from other areas. The port area will become one city that can be maintained. Although, I am not sure that the city can be maintained exactly for how many years, it can serve as the base for over 100 years once it has been constructed.”

90 years after opening the port in 1998, the mine was closed, but Miike Port remained, and then the Omuta City, the local community is still prosperous and maintained thanks to the port function

and so on.

#15

Lastly, we have succeeded the strong will of Mr. Takuma Dan. The port developers and planners are not really planning to build, construct the port, and I used to be the in charge of the port as well, so I say this with confidence. We promise to protect and preserve the Miike Port as world heritage, and then we were thinking in the long-term perspective for the sake of the community and the region and the world.

We would like to strike a balance between the functional operation of the port and the value as world heritage. Therefore, we would like to have a view toward the 50 and 100 years from now in the future, so that Miike Port as world heritage should maintain its value. If the value is maintained, it will maintain the local community society as well as the value of the world heritage as well. Thank you very much for your attention.

(Martin) Thank you for keeping to your schedule. If there are any questions for Dr. Nanba, this is a good opportunity, specifically about this matter of the management of the Miike Port.

I must say that, for such a complex diagram of plans and actions, I understand. You explained it in a way that makes me understand. I appreciate it.

If there are no questions, then I propose that we move forward. Thank you again.

Our next speaker is Dr. Takahiko Hasegawa from the Ministry of Land Infrastructure, Transport, and Tourism in the cabinet secretariat. Dr. Hasegawa's speech today will be about 'Conserving Industrial Heritage Including Private Working Facilities', one of the key issues of this whole matter that we have been talking about these days and these months and these years. I am looking very much forward to your opinions on this matter.

Conservation Challenge of Working Sites in Private Public Partnership

Takahiko Hasegawa (Ministry of Land, Infrastructure, Transport and Tourism, Cabinet Secretariat, Japan)

Thank you, chair. Good morning ladies and gentlemen. I know that there are various participants from oversees, so allow me to speak in English. First, I feel very honored to have a chance to speak in such a big conference. I am Takahiko Hasegawa working for the cabinet secretariat with the Japanese Government.

#2

Today, I would like to make a brief presentation regarding the development of a new conservation framework for the private, working, industrial facilities in the sites of Japan's Meiji Industrial Revolution. As you may know, this project has a unique character as compared with earlier Japanese nominations.

First, this project is serial nomination consisting of geographically dispersed component parts. Second, the ownership is varied from public bodies to private companies. Third, above all, it is very

important to note that the sites include private working industrial facilities such as Yawata Steel Works, Nagasaki Shipyard and Miike Port.

#3-4

Private working facilities in the sites have been owned and managed by private companies such as Nippon Steel and Sumitomo Metal Corporation, Mitsubishi Heavy Industries Limited, and Miike Port Logistic Corporation for more than 100 years. It is noteworthy that it is not the central government, nor local government, but private companies themselves who have protected these facilities with deep knowledge and expertise obtained from long experience of industrial operation.

It also should be noted that these private companies have not just maintained the facilities for their industrial activities as done in many other industrial facilities. Since these private companies have deep knowledge of and have high respect for the heritage value of these facilities, they have gone beyond the scope of usual maintenance work of industrial facilities and have successfully conserved the heritage value of these facilities.

#5

In the light of what these companies have done for the last 100 years, it is highly likely that these companies will continue to conserve these facilities through their industrial operation in a very proper way. However, in order to conserve these facilities for the future generations as world heritage, it is necessary to introduce effective government regulation.

In consideration of the context of this private facilities, as I explained, as well as relevant global guidelines, such as joint ICOMOS–TICCIH principles, government regulation should be introduced, of course, in the very effective way. However, at the same time, the regulation should be implemented with minimized negative effect on the industrial operations so as to maintain the environment where these private companies can continue to play an important role for proper conservation.

That is why the cabinet secretariat at the center of the national government has long taken leading role to develop a new effective and efficient conservation framework to which these private companies can willingly join as a member of public-private conservation partnership. From the very early stages, the cabinet secretariat had repeated contact with these companies in order to understand what is required for enabling these companies to join the public-private partnership. At the same time, many international experts, including those attending this conference, were invited to help the design of this new conservation framework.

#6

Based on such a very careful preparation, the cabinet secretariat proposed a new conservation framework, and on the 25th of March 2012, the cabinet decision was made regarding the basic structure of this new conservation framework. The cabinet decision of the Japanese government is a unanimous decision made by all the ministers of the government with an effect to bind all ministries indicating that the government as a whole will have full responsibility for the conservation.

#7

In this cabinet decision, it is emphasized that the living heritage or private working facilities should be conserved under the recognition that the sustained operation leads to the conservation of the heritage value as stressed in the ICOMOS–TICCIH principles and with an aim to achieve both the proper conservation and the minimization of the constraints on industrial activities. Under the close public-private partnership and strong leadership of the central government making the best use of knowledge and expertise of international leading experts on heritage conservation.

#8

With regard to the choice of conservation measures, this decision says the measures for the living heritage should be chosen among wide variety of options prepared by all ministries of the Japanese Government depending on situation of each property and in consideration of the opinion of owners themselves with the help of international leading expert on the heritage conservation and, again, to achieve two objectives both the proper conservation and minimization of the constraints.

#9

This cabinet decision has also clarified the implementation framework to be developed at the local and national level. First, at the local level, the local conservation council has been established by the cabinet secretariat as a place to build a consensus regarding the way to conserve the properties among stakeholders and a develop written agreement (a kind of written contract) among stakeholders.

It is important to note that in this local council, members of the council are not limited to local players such as local government and private companies. The council also includes the cabinet secretariat, which is in a position to administer the council, as well as other relevant ministries of the central government. This local council also take a role of monitoring all component parts in the sites. If any problem regarding the conservation is identified, all members of the council will discuss how the problem should be solved. If necessary, this local council or the cabinet secretariat may ask one member of the council take a required action for the proper conservation.

#10

At the national level, since the central coordination is essential for this kind of serial nomination, at the national level, the National Committee of Conservation and Management are called Conservation Committee composed of all relevant miniseries and all relevant local governments has been established by the cabinet secretariat in order to cope with issues which require discussion across the sites, and to monitor the situation of each sites based on the report from the local conservation council. If necessary, the conservation committee may ask the local conservation council to take required action for the proper conservation.

#11-12

The cabinet secretariat has also established the expert committee composed of domestic and foreign experts on heritage conservation. This committee is established to provide expert opinions on the selection of the heritage for the world heritage nomination, as well as to provide technical

advice regarding the conservation measures and conservation methods.

#13

This is the outline of the cabinet's decision. One of main objectives of this cabinet decision is to build a framework to which the private companies can join as a member of public-private conservation partnership. In this regard, this decision appears to be quite successful. In consideration of the contents of the cabinet decision, all private companies that are possessing the living heritage agreed to join the public-private conservation partnership.

After the agreement, under the leadership of the cabinet secretariat, a consensus has been built among stakeholders as to the choice of conservation measures; what kind of roles should be used for the conservation; and a limit of changes to the living facilities which is to be prescribed in the Construction and Management Plan (CMP); as well as detailed monitoring mechanism; and etcetera.

Such a process of consensus building should have helped the private companies themselves to have further understanding of the heritage value of their facilities as well as limit changes to the facilities. The national government has decided to provide financial support for these private companies joining the partnership in the form of tax exemptions as well as subsidies.

#14

With regard to the conservation measures, after a long discussion between the cabinet secretariat and private companies, as well as other stakeholders, and with the very strong support of the international heritage experts, two national level laws have been chosen as measures for conserving living heritage. The first is the Port and Harbor Act, which Mr. Nanba just gave us detailed explanation, and Landscape Act used for Yawata Steel Works, Nagasaki Shipyard, and etcetera.

#15

Also, Mr. Nanba has already given us these detailed explanations. I would like to repeat some important point of the Port and Harbor Act. Under the act, in principle, acts such as alternation work or refurbishment work to the port facilities are prohibited unless they are permitted by the port authority. In the case of Miike Port, Fukuoka Prefectural Government, this act Port and Harbor Act also prohibits the port authority from giving permission to any act that is against Port Plan. The Miike Port Plan was revised as Mr. Nanba explained to clarify that the heritage value of the Miike Port should be properly conserved. It was well clarified.

As Mr. Nanba clearly explained, the port plan is not decided solely by the port authority, but the national government is involved in the decision-making process. Moreover, under the leadership of the cabinet secretariat, members of the local council, which I just explained, and the members of the local council has had the long discussion regarding the limit of changes to the facilities.

The conclusion of this long discussion has been prescribed in the construction and management plan, to which all members of the local council commit themselves to. In addition, based on the cabinet decision, members of the local council have built a consensus that the act (this Port and Harbor Act) should be implemented in accordance with the construction and management plan. These stakeholders including the cabinet secretariat, local government, and private companies have

made kind of written contract to confirm this consensus.

Consequently, with such a very carefully designed mechanism, any act that can threaten the world heritage value; in other words, acts that are against the construction of the management plan shall, never be permitted under this act.

#16

As I mentioned, the Landscape Act will be used for the conservation of Yawata Steel Works, the Nagasaki Shipyard, and so on. Under the Landscape Act, all component parts to be conserved have already been designated as important structures by city governments. Under this Landscape Act, in principle, act such as refurbishment and alternation work on the designated important structures is prohibited unless they are permitted by the city government.

From here, basically, I may have to give the same explanation as the Port and Harbor Act; limit of changes have been clarified after long discussion among stakeholders, and clarified and prescribed in the CMP with a support of international leading experts. The members of local councils have built a consensus based on the cabinet decision that this Landscape Act should be implemented in accordance with the Construction and Management Plan.

Furthermore, they (meaning, the cabinet secretariat, local government, and private companies) have made written agreement to confirm this consensus. Consequently, any act against the CMP or any act that can threaten the world heritage value shall never be permitted under this mechanism.

#17

Regarding this conservation framework, it is also important to note that under this new framework, the Local Conservation Council, which is in a position to oversee the implementation of conservation measures (as I just mentioned), this local council can ask members of expert committee for technical advice on how the property should be conserved.

For instance, if it is not certain or it is not clear whether a certain alternation work to the facility can harm the heritage value or not, in such cases, the Local Conservation Council will soon ask the expert committee for their support, and the members of expert committee will soon give technical advice about how to deal with the problem to the local council. Without doubt, we believe this is one important mechanism for the proper function of this new conservation framework.

As I explained in this presentation, the conservation of private working industrial facilities is a big challenge maybe faced by many experts all over the world, and without doubt, require very new approach. We believe that our new framework that I just explained is based on public-private partnership as well as concept of central coordination and can present the new model of the conservation method for living heritage and will contribute to the future development of the conservation methods for living heritage.

Finally, I would like to take this opportunity to thank all of the experts who have helped the design of this new conservation framework, including those attending this conference, for their very kind and very helpful support. Thank you very much for your attention.

(Martin) Thank you very much, Takahiko. This is an interesting presentation; I am sure to all of

you, it certainly is to me. This is an opportunity for some questions. Massimo. I think they will bring you a microphone.

(Q1) Thank you for your presentation, Mr. Hasegawa. It is very interesting because it is an example of partnership between private and public institutions. It is very rare. I would like to know better the nature of this partnership. How much is cooperative, and how much is top down system? Because I see that private companies are present only at the level of Local Conservation Council. They do not appear in the conservation committee, and they do not appear in the expert committee.

When you say that the CMP is an agreement that establishes the protection of different properties, if it is a leading heritage, and if companies in the future need some adaptation, some changes, is there the possibility to review some elements of this plan of this agreement? Thank you.

(Hasegawa) It is a very delicate question. Allow me to answer in Japanese. I think you have raised several questions, so if I miss anything, please ask me again.

First point: private companies, how cooperative are they? Naturally, during the process of forming such public-private partnerships, and I did not have time today to go into details, we had had quite active heated discussions to deepen mutual understanding. It took a long time and it was not an easy process. Only after long-term process between government and private companies and other stakeholders. There is this deep level of trust built. Based on such deep trust, CMP which is a part of the recommendation text, private companies have contributed greatly to the text, and they were deeply involved in this project.

For your second question, how much top down is the approach? The concept of partnership, naturally, means that all those participating private companies and the local council members, they are important players, each has important role to play.

Amongst them, as world heritage, the central government must take leadership in proceeding forward. It is important in our view. As I said today, local councils and conservation committees are all administered properly by the cabinet secretariat, which means that the central government takes responsibility in preserving the world heritage.

Now, your third point: the fact that the private companies are not participating in the conservation committee. The conservation committee and the local councils under the conservation committee, there are close contacts and communications. That is the prerequisite. Let us say if there is any problem at the local council level, or in the central government, if there is a request that certain matter has to be discussed across different levels, we will take it up immediately. Council Conservation Committee and local councils maintain very close relationships. That is why, at the conservation committee level, only the government people are members. However, let us say in the future if there is a need which arises, maybe, other stakeholders, including the private companies, can become the members. That is a big possibility.

Now, CMP, in the future, is there any possibility or necessity to review some elements of CMP? Naturally, and it is like other heritage sites, at this point in time, it is impossible to predict with 100% accuracy what will happen in the future. There are risks that cannot be predicted, so with the help of the experts committee, we have the honor of having the advice from them in a very timely manner.

CMP, as it stands now, is subject to change. It is not that it is inscribed in solid stone and will never change. Based on the experience going forward on the conservation, if there is a necessity to review some parts, we will do that. As I explained today, the mechanism of the central coordination and under which the local council discusses with the advice of the experts, that mechanism will work again.

Firmly, I think – I do not remember the correct number, but every six or seven years, CMP will be reviewed. I think CMP stipulates that review process of every six or seven years. Other than this regular review process, if there is a necessity, if there is a part to be improved on the CMP, we will be flexible in revising it. The framework I talked about allows such flexible response. I hope I answered all of your questions.

(Q1) Yes. Thank you very much.

(Martin) I cannot see whose hand is up. Duncan.

(Q2) The structure that you have established appears somewhat regulatory in the sense that you have a mechanism for correcting possible use, even penalizing bad behavior. Do you have also mechanisms for rewarding or encouraging, incentivizing good conservation practices by the private companies and businesses that are subject to world heritage designation?

(Hasegawa) The Landscape Act, and Port and Harbor Act are the legal documents decided by the central government. If there is any violations, penalties arise. For those private companies who are cooperating with this project, are there any incentives or not? As you rightly say, we feel the same way with you.

I briefly touched upon that topic today. Those participating private companies in the partnership can enjoy the reduction or exemption of property tax. That is a formal decision by the central government which has already been introduced.

Naturally, the central government and local governments are committed to give financial support as needed, and, in the nomination, it is stipulated for example. If there is any alternation to be needed, naturally, it is not only the private company who has to bear the cost. The government will utilize the budget and give financial support for such alternation. We have decided on that policy.

(Martin) We have time for one very short question from Norbert Temple.

(Q3) Do I understand it right that you are changing the system of national monument care exclusively for this sites of the Meiji Industrial Revolution? Because, otherwise, the national agency for cultural properties is involved.

(Hasegawa) The cabinet decision, naturally, as candidates, these Meiji Industrial Revolution sites, we were thinking about those sites and coming up with this rule, but officially, it is not the only one. For example, going forward, in Japan, if there are industrial operating assets that in Japan are to be

nominated for world heritage, if there is a separate project, this framework will apply to that separate site as well. This framework is not only for the Meiji Industrial Revolution sites alone. This is a more generic framework to be applied to other sites as well.

(Martin) Thank you very much. I would like to move forward, and thank our speaker as well. The third speaker today, Dr. Miles Oglethorpe, of Historic Scotland, is the Head of industrial heritage studies and will speak to us about the 'Forth Bridge Challenge for World Heritage'.

Forth Bridge Challenge for World Heritage
Miles Oglethorpe (Historic Scotland, Conservation Directorate, United Kingdom)

Ohayo gozaimasu. Please excuse the minor sabotage that I have achieved just now. Being a government official working for the Scottish Government, I did not wish to be too far to the left or too far to the right, so I thought I would make a stand in the middle where at least I can see all of you.

I would like to begin by expressing my gratitude and the honor I feel for being able to be with you in this extraordinary conference. Yesterday evening was the most extraordinary experience for me. I will say in a moment a little bit more about the reasons I think that is the case. But I think this is a fantastic moment because, first, we are all gathered here together just after Japan has another industrial world heritage site in Tomioka in Gunma Prefecture. I would like to offer my congratulations to you for that. But not only do we have the Meiji Industrial Sites coming through, this is a golden period for industrial heritage in Japan because you have another one cooking, and that is a goldmine on Sado Islands being put forward by Niigata Prefecture. This is an extraordinary period, and it seems to me that, whilst you, in this particular project, have called upon the expertise of people throughout the world to help you with your nomination, what you have achieved today suggests that we should be coming to you to see how you have achieved the level of political engagement and support that you have for this nomination. Therefore, please accept my congratulations on what you have achieved. For us, this is an amazing thing to witness.

Now, to make that point a little bit more strongly, today you are going to hear from me about the latest United Kingdom world heritage nomination. This is a large entity. This is a very big bridge, but this is one thing and. You have 23 separate things. You have a large number of local government organizations, prefectures, cities, and so on. You have huge number of partners; lots of owners.

This is one bridge with one owner. Nobody lives in it. In our Edinburgh world heritage Site, we have half a million people living in or around it. Nobody lives in this. It has two prefectures; one at each end of the bridge. This is a very, very small project compared to what the Meiji Industrial Revolution represents. To give you an idea, many of you will have seen the documentation for the Yamaguchi, Kyushu and associated sites nomination, this is ours. This is it. It may look very large, but it is a very small piece of work compared to yours.

#2

The reason I am talking about this particular project today is because it is an operating industrial

site. First off, this photograph has taken last year and not in 1890, and we do not just run steam specials for tourists over it.

#3-4

There are over 200 trains a day, so this is an operating structure, very operational. The trains that run are not just local, they are not just regional, they run across the whole of the United Kingdom over the bridge. One of the big problems is you cannot see the bridge very well if you are on a train because only the windows at the side allow you to see it.

#5

What I am going to do today to talk about the issue of live industries is to briefly explain about the builders of the bridge, then the design and the construction of the bridge. Then I am going to talk about our statutory protection systems in Scotland, and then the biggest conservation job in the world; what we have done to maintain this extraordinary engineering structure, and then finally to talk about partnership management agreement, which will tie very well into the work of our previous speakers.

#6-7

Beginning with the builders of the bridge, and I think we have to acknowledge the fact that this structure is designed, emanated from one of the great engineering disasters in the UK and in the world. They are famous Tay Bridge Disaster in 1879. This disaster discredited the engineer who designed the Tay Bridge and who was already beginning work on the Forth Bridge. As a consequence, it became necessary to look for new designs that could survive storms, in particular at high winds.

#8

As a consequence of that, two English engineers, John Fowler and Benjamin Baker, came up with the cantilever design. They went into partnership with a Scottish engineer called William Arrol, and there is a connection here with Nagasaki crane, because William Arrol Company went on to build many of the giant cantilever cranes Dr. Newman talked about, and also to buy the company that built the Nagasaki crane.

#9

The Cantilever Principle is important because it has its origins in the Orient, but it is also important because many of you will recognize this gentleman, a Japanese engineer called Kaichi Watanabe who studied under the Scotts man Henry Dyer before coming to Glasgow University in 1885, and after studying in Glasgow University for a year, he then joined the team building the Forth Bridge. Here he can be seen demonstrating the cantilever principle.

This is an iconic photograph so much so that our bank, the Bank of Scotland (one of our banks) chose to include it underneath the 20 on the right hand side of our bank notes. Here is the real thing by the way. I think that it is important to recognize that, in Scotland at least, we tend to put a lot of heritage on our money, but we do not actually put any money into our heritage, so actually we do a

little.

#10-11

Moving on to how the bridge was constructed, and is what it looks like in elevation. It consists of three double cantilever steel towers built from mild steel, Siemens-Martin mild steel, and this was one of the first times that it had been used on any substantial scale. It was much more consistently reliable and the quality was much better than with Bessemer steel, and this really represented a revolution.

We were very lucky the great-great grandson of John Fowler gave us from his collection the original drawing that was put to the British Parliament to get the law through parliament to allow the bridge to be built.

#12

This shows you the nature of the structure of the bridge; three double cantilever towers and then an approach viaduct at each end.

#13

This is one of the approach viaducts, the longer one, and this is what it looked like. Now, we are extremely fortunate to have a very large photographic collection and glass plate negative originals showing the bridge being built from beginning to end, and this sits in our national records of Scotland. You can see here that it was built and fabricated in steel parts and put together with bolts and then the rivets replaced the bolts. The whole steel structure came together using a range of technologies, not least those from the Glasgow ship building we heard a bit about yesterday in one of our sessions.

#14

The view must have been extraordinary at that time. Arrol was particularly famous for innovation and introducing new technologies particularly associated with hydraulic power. For example, he introduced hydraulic riveting machines and lifting machines and some hydraulic lifting systems that are still used today in the offshore oil and gas industry; the same basic principles.

#15

The scale of the bridge was extraordinary for its time, and this was a comparative illustration designed to show how big the bridge is with St. Peter's in Rome in the background and St. Paul's beneath that in London. One of the most entertaining scale comparisons is with the Eiffel Tower. You can, in fact, put two Eiffel Towers end to end in each of the three double cantilever towers of the bridge. So the bridge comprises of the equivalent of at least six Eiffel Towers on their ends. This was a source of entertainment to a satirical magazine called 'Punch' at the time which produced this rather rude cartoon making fun of the Eiffel Tower.

#16

I do not intend to go into too many statistics, but perhaps the most important statistic is that it is

2.5 kilometers long, the middle parts and viaduct contains over 50,000 tons of mild steel and half mild steel, and within that our 6.5 million rivets holding it all together. Because it is mild steel, that presents some interesting conservation challenges, which apply, in particular, to structures like the Nagasaki crane.

#17

Now I am going to talk a little bit about statutory protection for operational live sites because that is the issue of this session of a conference and a major theme underlying your nomination.

#18

In Scotland we have a system of designations (broadly six) and it is really the first two of this list that are most important to us; listed buildings and scheduled monuments. Both of these have different legal systems supporting them and allow different levels of flexibility when managing change.

#19-20

Beginning with scheduled monuments, this is very much associated with unoccupied historic and archeological sites; the emphasis being on no change if it is all possible. There are some industrial sites in Scotland, such as Bonawe Charcoal Burning Iron Works (we saw many examples of these yesterday) which is operated by Historic Scotland, my organization, but the idea here is that it is not working, and we are not going to encourage any change here at all. It is all about no change.

#21

We have other industrial sites in the care of ministers such as Kinnaird Lighthouse, and although it has a lot of workable equipment inside, it does not operate. It is fossilized, and the idea is we look after it and maintain its condition as it is now. It is an industrial site but it is not working.

#22

However, there are one or two exceptions even for scheduling, and our canal system is scheduled. We manage change because you have to maintain it because it is operating. You have to maintain it, so you manage that change through a consent system for specific types or classes of work. That seems to work okay.

#23

It is worth saying that the last successful UK world heritage nomination was Pontcysyllte Aqueduct in Wales built by Jessop and Telford (Telford was another Scottish engineer) and is an operating industrial site. The reason that it is so successful and it works and it can be maintained is because it is an operating site. If it was not operating, it would be impossible to maintain.

#24

If we look at our Scottish canal system, much of it was not operating until the early 21st century, but, as a consequence of the Millennium Link Project, the Falkirk Wheel, a new canal lift system was

built in the middle of Scotland which allowed us to reopen both the Forth and Clyde Canal and the Union Canal connecting Glasgow and Edinburgh. This was a major plank feature of regeneration scheming across Central Scotland that has brought life back to areas that have suffered terrible economic decline. But this was done to a scheduled system, so even with scheduling, it is possible to manage change.

#25

Moving on to listed buildings, listed building is a different legal system. We have category A, B, and C; A being the most important. Both of the structures you see in this image, which is in the town where James Watt, the inventor of the improved steam engine came from, both of these are category A listed. There is a giant cantilever crane, which Dr. Newman mentioned yesterday, and there are raw sugar warehouses here. These are not usable now for their original use, but the listing stopped them being lost to developers, and allowed for them to be reused as part of a major regeneration program. Listed buildings provides you with more possibilities to manage change, and that is very, very important for industrial heritage.

#26

For us, Historic Scotland, we have a project in Stanley Mills in Perthshire in the center of Scotland, and this is also A listed, and we managed to convert most of the mills to apartment, but keep Arkwright mill on the right hand side here as a museum; a highly successful award-winning museum.

#27

There are other examples such as one of the flagship mills in the Coats and Clark's Empire in Paisley here which has been successfully converted as part of a generation program, so listing really works. But these are all dead in terms of their original use.

#28

There are industries, however, that are very much not dead, and we have, in captivity, fossilized a distillery called Dallas Dhu, and it is fossilized with no changes allowed.

#29

However, we have many whisky distilleries with fantastic architecture and equipment that are listed but are working. Indeed, this is a really good example of how the architecture and fabric of a live industry is used by that industry to promote its own products. This is Highland Park Distillery. I thoroughly recommend you to drink the whiskey, and this is from the islands in the north of Scotland. But there are many other types of live industrial structure that are operational, but have the highest level of protection.

#30

I would cite Glasgow Corporation's Water Supply System, which dates from 1855 and connected Loch Katrine with Glasgow. We have listed the most important parts of it and yet it is still working

every day all the time.

#31

Even more conventional heavy industries; this is the Fairfield Shipyard in Glasgow. It has a fantastic engine works in the middle of it that is category A listed. It is still producing ships for British aerospace and the best way to maintain the structure is to keep it being used for its original, or close to, its original purpose.

#32

Perhaps our biggest project in recent years was to systematically record and to list to protect, in collaboration with the hydroelectric industry, hydropower stations of historic importance. we have been moving into recognizing the importance of heritage of sustainable energy and our 'Power to the People' project. I will come back to that to a second.

#33

Of course, it is not only the Forth Bridge. We have a huge amount of historic infrastructure attached to our railways.

#34

One of the most famous examples is the Glenfinnan Viaduct. Again, it features on our money, but more important than anything else – I mean, you cannot imagine anything more important than the fact that it is also featured in the Harry Potter films, so what more can you ask for?

#35-36

I wanted to finish this particular phase of the presentation by citing the only other large bridge that is currently on the world heritage list as an entity. There are many bridges in other world heritage sites, like the iron bridge in the middle of Iron Bridge Gorge, but the Gorge, it is an area, not the bridge, that is a world heritage site. This is a bridge that is a world heritage site in its own right. It is the Puente Vizcaya near to Bilbao in Northern Spain in the Basque Country. This operates every few minutes.

It has a suspended gondola that moves backwards and forwards carrying passengers. This bridge has been repaired radically. It was blown up during the Spanish Civil War, and they have repaired it beautifully, and it now operates. The reason it is possible to maintain it is because it operates all the time and earns its keep. Here you can see the gondola and the car and the pedestrians. It is a truly wonderful site.

#37

Ours, as I said, is a very, very much an operating site, so now I am going to briefly take you through what we have done to keep it operating. When I say, we, I should say that I did not do it.

#38-39

In 1989 when I visited the bridge, this is what it looked like. There were very serious maintenance issues. It is worth saying that, in the 1980s, the future of the bridge was not certain. What happened was in the Thatcher Period of government, there was a review of the railway system. We had already had a catastrophic review in the 1960s when the then government ministers, who had an interest in road travel, decided to shut a large part of the railway network. It almost happened again in the 1980s.

There were going to be no trains north of Edinburgh and Glasgow, and that would have meant the bridge was to close. It would have been impossible to maintain it. It would have been a conservation disaster? How would you keep something as big as that working?

#40

At that time people started to propose it for world heritage. There was fear in the railway community that the world heritage for an operating structure would be a disaster. But, in fact, they changed their mind. The government did not close the bridge. Instead, it decided to invest in the bridge in the 1990s. From 2002, they invested £140 million, which is quite a lot of money.

#41

This involved having to take all the paint off the mild steel. It was poisonous. It had heavy metal, and then to put new paint developed in the Offshore Oil and Gas industry in Scotland. At the end of that, the railway industry decided it liked world heritage and it could live with operational status. The new paint system comprised an undercoat, a primer, and then a glass-flake epoxy main coat, and then an acrylic top coat. This was one of the most massive operations you can ever imagine.

#42

The old paint had to be removed. It had to be grit-blasted. It was poisonous, so they had to wrap the bridge up in white encapsulation. The paint and the grit had to be vacuumed away. The new paint had to dry, so as a health and safety challenge alone, it was amazing.

#43

This is the bottom of one of the towers.

#44

If you look at the orange person on the top right of the picture, you can see how big this is. This is a small part of the bridge, but this is the man here.

#45

This is what the bridge looks like for 10 years with pieces white encapsulation moving about, and incredible quantities of scaffolding.

#46

4000 tons of scaffolding at any one time, 4.5 million working hours, 1500 people employed on the

bridge since 2002, over a quarter of a million liters of paint, 200 trains a day, never interrupted, completed in 2012, and it was at that point we were invited to take on the nomination process, so we had been working on this since 2012.

#47

The paint now looks absolutely marvelous. We think the paint probably looks better than it did when it was first completed.

#48

Now, one of the key facets of managing change on the bridge is a partnership management agreement that we have developed in a similar way to yours.

#49

We have done this with the help of our Cabinet Secretary for Culture and External Affairs, Fiona Hyslop, seen here.

#50

What this does is sign network rail the owner up to working with us Historic Scotland for a minister as the regulator, together with Edinburgh and Fife (the local prefectures) together to make sure that we manage change on the bridge as efficiently as possible so as to protect the bridge to the highest level of conservation whilst not damaging the operation of the bridge. We have built this into a management plan. Believe it or not, there are two documents in here.

#51

There is a management plan in the nomination document itself. The Partnership Management Agreement plays a critical part of that. It also helps us monitor the state of conservation of the property.

#52

That has proved to be a simple (because it is only one site) way of keeping an eye on what is happening on the bridge.

#53

It would not have been possible without our partners, the owners of the bridge, network rail, and this man in particular, Ian Heigh, who is in charge of the bridge now ,and oversaw the 12 years' worth of conservation.

#54

We used the model for our Partnership Management Agreement, first tried out with Rio Tinto Alcan, who runs Scotland's oldest hydro scheme Kinlochleven, so we have already done it with them and this scheme opened at exactly the same time as the Nagasaki crane in 1909.

#55

Part of the monitoring and the conservation program also involved digital documentation using 3D laser scanners. This is very much a part of our future plans. This is part of Dr. Lyn Wilson's team (or James'), and Lyn is going to be talking this afternoon in the final session about this and other digital documentation that we have been doing.

#56

To conclude, being a working site has been the key to the future of this particular industrial monument, but that applies to every scale of industrial working heritage. The key to it best chance of survival is if you keep it working.

#57

As I said, the bridge now looks better than it ever has. We hope that when the evaluators come in early October that they will be impressed by what they see.

#58

This was the moment that we launched our world heritage nomination on the 20th of January. It got to Paris, despite an air traffic control strike in Paris, which caused us a bit of fright.

#59

This is what it looks like. This is the cover of the nomination document. For me, it is so exciting to find ourselves alongside the Kyushu Yamaguchi and Associated Sites nomination. We will be there in Bonn next June with you.

#60

All I can say now is to wish you all the luck that you need for a successful nomination and hope that we are fortunate also. Thank you, and congratulations.

(Martin) Thank you, Miles. Questions?

(Oglethorpe) Only easy ones please. Do not ask about referendums.

(Martin) I am glad you brought some money to the presentation. That was a good step, I like that. I see Koko.

(Q1) The money of £120 million in 12 years, where does it come from?

(Oglethorpe) It came from Network Rail and central government funding, and some from the Scottish Government, so it is all public money. It was justified on the basis of keeping the infrastructure open because it would not be possible to run trains unless they did some work.

(Q2) Thank you very much for the lovely presentation. My name is Masaki Okada from Kinki University, Osaka. I have quite a simple question. You mentioned about the operational heritage, but operational means with the original use, and also the different new purposes, like the mills that are now used as a condominiums or flats. Do you think we can still call it as operational heritage even it has already lost the original purpose?

(Oglethorpe) Sorry, but could you repeat the last bit?

(Q2) Just I was wondering if we can still call the renovated industrial heritage as still operational with the new use?

(Oglethorpe) They are not operational, but it has been possible to maintain a lot of the traditional original fabric in place, even though they are apartments. Though they are dead, but the other ones were active.

I think it is also worth saying that we are working very much on the sustainability of building. Industrial heritage offers the opportunity to save a lot of energy by not destroying existing buildings; recycling what you can. Hence it is fantastic opportunity to promote regeneration whilst also leaving a historical footprint for the industrial communities that live in the area. Industrial heritage has so many things to offer that more conventional heritage does not.

(Q2) Thank you very much.

(Martin) Are there any further questions? If not, thank you again Miles.

Our final speaker today is Dinu Bumbaru. Dinu is Policy Director at Heritage Montreal. Many of you know Dinu in other roles, longstanding operative with ICOMOS including the co-founder of the 20th Century International Scientific Committee, and I must say, a key driver in the ultimate expression and success of the creation of the joint principles between ICOMOS and TICCIH, known as the Dublin Principles. Without Dinu, that never would have happened, I guarantee you. As an insider in the process, I guarantee you that is the truth. I thank you for that, Dinu. Dinu's talk today is about 'Silo 5 in Montreal'.

Silo 5 in Montreal, and Integrity of World Heritage Requirements in Serial Nomination

Dinu Bumbaru (Policy Director, Heritage Montreal, Canada)

Thank you very much, Patrick. As Miles just described very well, it takes two sides to the river to build the real bridge, and you were at the other side for to take the joint TICCIH-ICOMOS principles. Thank you to you, Patrick. Thank you very much to the organizer, in particular Koko Kato was given us this energy, and I will compare her to the mighty Saint Lawrence River in my city, which, with its flow of water it can flood, it can devastate, but it provided the energy to position ourselves in the North American continent. I will go bit further. Thank you very much to the organizer. I would

like to also quickly thank Stuart Smith who got the idea of suggesting my name, and ICOMOS Japan, Dr. Nishimura, for authorizing me to join in this important process because we are a friendly family which operates like that.

#2

I would like also to congratulate Japan for the 50th Anniversary of the Shinkansen, and the Inscription of Tomioka. This is how I was welcomed at Narita just a few days ago, and it was a great success, and as Miles said, it is something that we would like to help contribute because all of these things including the Meiji nomination, are so inspirational to others.

The presentation I would like to share with you has to do with integrity. It is one of the key conditions on world heritage inscription, and it is one that has not benefited from the same exposure, reflection, and discussion because these are not measuring words; these are philosophical and concept and so on, as authenticity. This year is 20 years after the Nara Conference on Authenticity. Sir Neil yesterday shared some observation on that applying them to some kind of British cars or whatever. I am not in that movement. I am more into the built heritage, and I will try to apply these concept to build heritage relating to some of the great sites that we have been discussing here.

#3

This may look like a rather modest structure. This is a rather important one. Probably, there is only Michael and perhaps Duncan here who know what this is. That is why I was about to tell Duncan not to say, it but this is a sugar shack. If you go to breakfast here, you will find maple syrup, and this is in this kind of place that the maple syrup has produced in an artisan way.

Actually, this is my grandfather's sugar shack, so we are rooted in the tradition of the land. But the shape that these tradition takes do not look a monumental structure, but they carry a lot of memory, a lot of tradition, and they are also very hard to read in differ contexts. This is also to touch this notion of material integrity, the use and function, the tradition, the software ,if you want, associated with this and the context. If you look at it like that you just say it is a piece of rusty construction in the woods, but in the winter it is alive because that is the time when it functions. It is a matter of, perhaps, relating to these.

After a few words, I will go gradually towards the discussion of integrity on the case of elevator number five, but a few reference on the geography. A lot of what we are discussing here is in the great inspiration of history. I will propose you to change our reference point. Let us talk at least of history and geography together, because history is not existing outside of the place, outside of the geography in which things happen and people establish their society. There is not a harbor in many places. There is a harbor in Nagasaki because of the geography, the local and the global geography, and this is a shift from the traditional way, which is to fill the room with historical descriptions totally de-spacialized. We are dealing with heritage, so we are dealing first of all with the place. The Australians have insisted on that word. We used to say 'historic monument' or whatever, but there is an X, Y, and Z associated to these things, history is the fourth dimension, and the spirit is the fifth dimension that are added to it.

#4

The geography of Montreal is that of an archipelago. We have about 325 islands, so it creates a lot of little island mentality and big island mentality, so there is a lot of discussion between the bridges that we were talking about. There are many of them and many disputes, but because of its position, it was the key to the continent because you could not go upstream. There were rapids in the Saint Lawrence up until 1959 when the seaway was opened allowing ocean freighters to go all the way to Chicago. Otherwise, this was the source of the wealth, and it is an important element. It also created a mentality of a shore village with the historical core.

#5-6

Originally, The economy was perhaps less a matter of industry than trade, because the water was the great exchange network, and it was the original purpose. We had to deal with nature. Of course, this is not the weather that you have in Tokyo these days, but this was the kind of spring that we had in Montreal with the attack of the city by the ice from the river. Now, over a period of 200 years, the effort was put on how to not necessarily control, but use the river; use the power of nature, and turn them into energy for the industry and the modern society.

#7

Yesterday, Duncan was talking about these bird's-eye views. We are talking of the cradle of industrialization with the Meiji sites that are proposed here. Montreal was the cradle of the Canadian industrial revolution starting with the 1820s, and the creation of canal systems that were accompanied by a legal development that created an economic value for the flow of water. Our society is interested in things that are either very poetic or very legalistic. The power of water existed in abstract way, but in the 1830s, they developed a legal instrument to rent it That created a whole new urbanism related to that energy in association to the development of the port and the factories.

##

There are four clans that are associated to the heritage. The first is the public sector. We have been hearing about it in the word that the cabinet secretariat and the Japanese Government. Yesterday we had an outstanding display of unity and energy in the reception, the statement by the Prime Minister and so on, but the public sector is one of four; public sector, private sector, academia, and civil society. My clan is the clan of civil society. It is usually the clan that has the least means, no legal power, no money, no credentials, but it has the power of the spirit of endeavor, the spirit of initiative, and the freedom of moving ahead. We do not need to ask permission. We have just to try our luck.

##

The way we have developed our actions since the 1970s, we were created by a lady called Phyllis Lambert, who founded also the Canadian Center for Architecture. She is the person who hired Mies van der Rohe to build the Seagram Building in New York. She was a client. Imagine that kind of energy. She created organization to save neighborhood and give a new spirit to the word 'urban

development.' We did that with principles. We did that with concept.

#8

I will share with you that the source of doctrine, the source of intellectual development today in 2014 is not only limited to government and academia. It is a more expanded field, and the challenge is to create these forums where these different viewpoints are connected.

#9-10

One of our big challenges is that our city is built in wood. You know that in Japan. Wood causes for a lot of maintenance, so how do we introduce maintenance in society is also a challenge for conservation and development. We save neighborhoods, turning entire parts of the city into cooperative housing where the owners are the shareholders of the neighborhood, so the notion of ownership private investment, it turns. Also, we connect investment and enjoyment because we have to understand that property is also a place of meaning for citizenship and so on.

#11

We help save historic buildings. This is the Windsor Station, one of the grand railway terminals. This was the railway terminal in Downtown Montreal of the Canadian Pacific Railway, a major building designed in part by American architect Bruce Price. Of course, in the '70s, the railway company wanted to take it down because it was not nice to have an old station.

They wanted to demolish everything, and it was very hard to stop them because, in the Canadian Constitution, the Transportation Act excludes railway companies from the statutory heritage protection system. They are the province, who have the power to protect in our constitution. It is basically, in the Canadian structure, you have god, the railway company, the federal government, the provinces, and so on. Nobody actually saw god, but we saw the lawyer of the railway company very often, and they are not saints. This happened because the Montreal society could league and the kind of influence that was existing between the family, the various generations of Montrealers and their role in the society could remove the idea of demolishing that landmark from the head of the executive of the railway company. It was saved. Recently we worked with the Canadian Pacific Railway to transfer this property to a private developer so that there is a protection that follows on.

These challenges that the Meiji site have been facing, somehow, we can connect very well to that because we can see the difficulty, and it is a matter of how you go to a jungle alive, and you make the heritage across the jungle with you. By the way, this is the normal scenery in Montreal, not so many people bicycle in the winter.

#12

A big challenge we have also has to do with the setting of our heritage. This is not in Rome. It is the Catholic cathedral in Montreal that was shaped after Saint Peter to show the loyalty of the French-Canadians to Rome more than to London. It was built across the street from the Protestant Church, and the space of the city is a symbolic space. It is not just functional, and people here, you are very interested in functionality because of engineering and so on, do not forget various symbols,

and the companies also established their landmark. They show their place and society. But the issue of the surrounding space is a big challenge to date, which we have to address. Talking about conservation, also ask about how do we deal with the urban planning loss, the regulation, the economy of the city? All these things are not alien to us.

##

You know about judo, how you turn the force of your adversary into a force for you. We have to work for this and be very creative as these heritage commandos. For those interested in Mrs. Yoko Ono, and the building to the right is Queen Elizabeth Hotel where the famous Bed-In took place in room 1742 where John Lennon and Yoko Ono wrote their song, 'Give Peace a Chance', but there is a street next to it and our slogan is 'Give Peel a Chance' because it is Peel Street.

#13-14

One of the things we have also made our society evolve is to understand that the heritage of the industrial era is not just the machines, the smokes stacks, the factories, and the labor problems. It is also the city parks. The City Parks Movement was created in the 19th century. This is Montreal Park. It is the result of petitions, and it was created as a social equalizer to create a sense of accessibility to the rejuvenating experience of nature in the modern society as a prevention measure against riots and against social tension that would have destroyed the industrial society. It is interesting to see that a park is also an element of that modernization of society. I am sure if you compare, you see that the parks in Japan, you have some that are very ancient in their roots, but some are also inventions in the modern time. I am thinking, of course, of Ueno Park, which is partly the result of the revolution, so what else can you do.

To manage that park, I was listening to the presentation of our colleague from the cabinet secretariat about the framework. At my organization, it took us 20 years of operation, lobbying, public conference, and so on, to get the mountain protected. It is an operation type. There are 120,000 students coming to that site every day. It is crossed by railway trains. It has one of the most important antennas operating on the site. It is a living public park. It has a number of research hospitals.

If you talk of living, there is a sanctuary to Saint Joseph with 2.5 million visitors a year. We are not talking of a fossilized site. However, to have it protected, it is required all the ministries of government to sign at the same time. That was accomplished, and the City of Montreal also had to sign and it created, what we call a **tableau d'concept conservacion* ((セッション 5 英)01:44:01)* where the municipal, public sector, the NGO and the institution owners are together to develop the Conservation and Management Plan. This process will celebrate 10 years next year; just to say that these things are slow in their development, but they create more than a nail can nail a piece of wood, they have created a ring of alliance. That is something which is also, I think, worth mentioning in line with the discussion here.

#15

That is another view of it. One of our accomplishments, and that is where the question of

integrity comes, is that we managed to get this structure, which is Habitat 67. It is a legacy of Expo 67 in Montreal, which was the Centennial of Canada event, international event, the one before Osaka. However, I am sorry to say that we had more visitors in Montreal. We had over 51 million, and the Expo was also the opportunity to create the subway, to create the highway network to improve a lot of the city like we do today with the Olympics. Good luck for 2020.

This is a landmark of modern architecture. It is important for a Montrealar, but we do some research and we find out it is important to the world because it is one of the few buildings from Canada referenced in scholarly work on the history of architecture. The challenge is how do you conserve this, how do you deal with concrete, how do you deal with the repair? It is a living place. You are talking of operating. The people living there, they are the CEOs of the Mitsubishi and Japan Steel of Canada. It may not be a factory, but there is a lot of power in the owners of that block of flats, and you have to imagine it is another kind of life.

#16

An operation that we did also and that helps us turn industrial heritage into popular culture (even to a point that you have iPhone casings that are made out of it now) is saving the milk bottle. People were depressed. The spirit of the industrial city was going down with the transformation, and the ruins of the industrial city were right in the middle of downtown. With our colleagues and volunteers, we engage into an international operation to repaint the milk bottle. It is a giant milk bottle. For those interested in the history of milk distribution, Montreal was the first place in the British Empire to develop door to door delivery in recyclable milk bottles. Therefore, this is an important claim to fame, but somehow people did not know that whole story, they just felt very touched by the shape of the milk bottle because it has a feeling of home to it. It is how industry and home connected. Probably, you have this. Every culture here has a point of contact with the mega-industry and the home. That was rusting away, so people were sad, and we said, "Let us repaint it." Of course, we will change the appearance. It might have some problems. Maybe, Norbert will say is not just a ruin now. However, we saved it, and even we put the English language signage on top, which is an important Act in Quebec because it is forbidden to have new English signage.

To do that, we had to go to Germany (not to find the paint) but to find the owner, because nowadays a lot of real estate is international market property and portfolio of investment. It is no longer a national thing, and we had to go there. It took us a year and half to put that milk bottle back into shape, and it is quite happy.

#17

We did the same with international corporation Smucker's and ADM to save the Five Roses sign. Now there are movies, there are popular songs and novels that are written about that sign. We are quite happy that our job was simply to keep it their alive. Smucker's invested a million dollar last year to redo the electrical system. Again, you have the question of integrity. Should we have kept the milk bottle rusting? It would have lasted long time, but mentally people would have said it is lost. We have to reintroduce a notion of optimism and good spirit. The Five Roses sign should have been kept with the old electrical system that eventually was going to decay and not operate anymore. I

think we made original balance to push for it to continue to be part of the life of the city.

#18-19

Our organization, as I said, is also able to, not just to get enthusiastic about things, but to develop a language that can help the private, the public sector, and the academia evolve using the source of our ideas also. Therefore, we developed a kind of framework of heritage dimensions, and they are inspired by the World Heritage Convention. They are inspired by ICOMOS texts. They are inspired by the Australian National State Definition; different parts like that. We put also that phrase that Michael Petzet gave us in Latin about monument, which is a quote by Cicero, of course: "*It is always handy to place in a cocktail reception((セッション 5 英)01:49:16)*." It means, essentially, that a monument is something that reminds us of something, so it is not the grand monument. It is the memorial connection, which is part of the intangible. Therefore, the built, the landscape, the memorial, the archeological, and the natural are those five dimensions. They are all present in your work, I am sure.

Perhaps, a little point on what is industrial heritage, we prefer the term 'engineering works', because there is civil, there is industrial, there is military, but the ingenuity, the process of designing of fabricating is interesting and is common to those. Perhaps, that is the guidelines that were developed by all the provinces and territory in Canada, and it is the vocabulary that they have used.

#20

Another reference, perhaps it can be useful in inspiring or guiding the management of the Meiji Industrial Revolution Site, is a definition of 'sustainable development'. The Quebec Parliament adopted a law, and is the only one we could find so far, that says that the protection of cultural heritage is a key principle of sustainable development. It is not just something that you check in the management or the impact assessment, it is the key principle. There is no sustainable development unless heritage is protected. 'Protected' means kept alive also, so it is perhaps an interesting reference.

#21

Now, this is the Silo Number 5. It is a property of about 850 meter right in the historical center of the city. It is not a business or CBD of today, but near Old Montreal. Old Montreal is to the right of the picture. It is a property that is comprised of different constructions, but also a large network of conveyers. I will go into that a bit later. It is very nice with the trees. You have to imagine that this is not the original setting. There would have been a lot of swearing workers all along the shore here.

#22-24?

The landscape: the city in the 1840s, you can see it very strongly connected to the water. You can see on top of the image Victoria Bridge, which was designed by Robert Stephenson and built. It was the longest bridge in these days, but certainly does not have the heroic character of the Forth Bridge, because it was simply a tube. It is longer, but it is less glorious, I would say, but we love it. It is not

bad, but we do not have it on our bank notes. Here are our $20 notes, and you can get 2.5 of those for just one of these, so this is a much better deal.

One thing is that the site of Silo Number 5 is on the river. It is here in that site, but what you see from that area here, besides the fact that you have immigrants' burial ground, it is all where the Irish immigrants were buried after they died on the construction or on the ship, but it is that most of the area here is fill land and it has a constitutional implication. In Canada, the water of navigable waterway is federal, but the riverbed is provincial. The silo is built on fill, so a constitutional arrangement is required for its conservation. I think in Japan, you have a more harmonious society than the relationship between the Province of Quebec and the Federal Government of Canada, so I think we can compare notes.

#25

The site is here. You see it is a very long structure. It is crossed by an active railway. Although the grain elevator itself ceased operation in 1994, it was gradually decommissioned. It was supposed to be demolished because it is old equipment. I hear that the companies are the best keepers, but it depends of their conscience. In our case, the port authority just saw this as extra equipment that was costing $150,000 per year to maintain, so they said, let us get rid of it. We managed to stop that. The site is an interesting one. The grain elevator is there. It is a complex. You can see the conveyor. The highway is there. This is an active railway which is strategic for the City of Montreal. It makes the transfer time in Montreal shorter by six minutes. It is very competitive industry, the eastern seaboard harbor facilities between New York, Montreal. There is Norfolk also in the US. Halifax is starting to take our share, so that six minutes is very important, and it creates a challenging condition for the repurposing of the whole site here.

You see also that canal. This is the Lachine Canal which was a bit of a competitor to the Erie Canal. It was opened in 1825, and it is part of a system of waterways which included the Rideau Canal that was put in the world heritage list. Now, the canal here serves as a recreational corridor, but that transformation has had beneficial and negative impacts on the industrial heritage that lines it, because many of the site have been redeveloped for residential purposes instead of keeping their heritage character and structures.

The silo itself is a grain elevator. It was built originally in the series of metallic square *** ((セッション 5 英)01:54:57), so it is riveted steel from 1906. It was a place of development of the technology for tumbling. I am not going to go into detail, but trains would arrive there, and the cars would be tilted so that the grain gets out easily. They are emptied at a great rate. We have to realize that, between 1930 and 1960, Montreal was the largest wheat handling harbor in the world, so this is one of the silos. There were half a dozen lining up the river, so it was a huge concentration draining the market and the produce from the Canadian Prairies, but also from the American Midwest according to the rates of exports and the taxation. This is no longer the case, because the Crowsnest Pass rates on the Canadian Rockies have been abolished, so the grain is now going mostly to the pacific.

The 1903 section is there. This is 1930/1924, it is in concrete. As you can see, it has physical problems, and this is challenging. It is an additional challenge when you want to convince the public

of saving these things. This is the 1957 extension. You can imagine that they were still building these about 50 years ago. We are not talking the 19th century.

#26

The battle to save it was quite harsh. You can see on top the editorial is from the largest French speaking newspaper outside of France, and it is basically treating me and my organization as 'the heritage crazy people'. That is the title, '*Le Fous Du Patrimoine*,' that was us, so we had to reply. But in the end, we organized. Following this campaign, a public symposium, a bit like this one here, at the Canadian Center for Architecture, with the harbor authority, the port authority worked jointly together with us and ICOMOS Canada, Docomomo, and the Industrial Heritage Association. At the end, the chief engineer of the harbor and vice president of the harbor said, "Wait a minute, this grain elevator is our heritage. We will take care of it," and he became the guardian of the heritage.

You have to find the moment when you turn the enemy into the ally. That is the complex thing. Sometimes, it is essential, the media, public discussion, but also the ability to talk to each other. You cannot insult each other all the time. You have to choose the moment. At Heritage Montreal, we took the opportunity to start reflecting on what is the place of Montreal in the world heritage list in Canada? Could we contribute something? The silo seemed like an interesting prospect. The Canadian List of world heritage sites is one that has been growing, and now it is gradually becoming more balanced between culture and nature, but, traditionally, it was very much natural objects only, and so we have big challenge.

#27

In the tentative list of Canada, there is only the Klondike, which is now expected to be nominated, which has an industrial/technological component and one that is not just of interest for the Canadian or the Yukoners, but also for the world. There are plenty of heritage sites that are great for Japan or for local municipality; how you connect them internationally is the same question that we ask ourselves.

#28

This is the Dredge Number 4 in the Klondike. One of the challenges with the Klondike nomination is that Canada chooses to propose it as a joint nomination with the USA, and I think the USA never noticed. It is so usual. Do you have problem with your neighbor here in Japan? Maybe. Well, in our case, it is this kind of like – well, anyway, that is not the topic of this symposium. We can do another one across the street.

Dredge Number 4 is a property of Parks Canada, so it is a public asset now. It was developed partly with the money of the Guggenheim Family, so it is a great endeavor. You have got Siemens Power Plant up north. It is just incredible. It has big challenge now of conservation. It is made out of wood with industrial machinery in it, so the issue of integrity is there.

#29

A site that is also one of our favorite modern sites is this one. Neil knows it very well. It is the

ownership of ICOMOS Canada member, Charlie Fairbanks. Charlie is the descendent of the – Patrick, also you visited. Together we saw it. We had our sticky toes in the bitumen. Yes, I will finish soon. This is the oldest operating oil company in the world. It was created in 1858. They are still extracting oil from this. They do 32,000 barrel a year. Did you see it? When you are in the field, you have got some cows, and then you have these wooden things that move in the field. It is very modest, but we should not be ashamed and just think oil started in Saudi Arabia or something. It started with this kind of invention that is a demonstration of the human spirit.

#30

Integrity, if you go, you take this case, and you would try to connect it, I would like just to insist on the notion of wholeness and intactness. This is the key element. The more we make sites that are complex series, and in this case series of series, the more we open the flank to questions; is it complete? Is it a bag of things or is it really a set of thing? These are intellectual concepts that are important to keep in mind. It is also the issue just this point here, the word neglect; so maintenance. It has been raised many times about how a simple operation like maintenance is another one.

#31

That is another element of the operational guideline, the good condition, the deterioration process should be controlled. Control does not mean stop. The paint that Miles says is going to last may be a thousand years. Well, after a thousand years, somebody else will have to repaint it. In our case, we tried to question this with Silo Number 5, but also Habitat 67, because both are from the age of industry and both use concrete. What is the concept of integrity applied to concrete? They are not sort of archival concrete like the Dome in Hiroshima, which is archival, but the concrete for building that have to keep quality as living building.

#33-35

This is Habitat 67. You can see the concrete is starting to show problems. It is a very complicated site because of the intricateness. When they build it, they actually invent new cranes to build it, and they probably have to invent new cranes to repair it now. Now it is a historic monument, so they have to keep it. Another issue of the integrity has to do with how the life of the complex impacts on the architecture of the complex. People were each given a terrace on the outside. That was the ideal. The utopia of Habitat 67 is affordable houses with a grand terrace to look at the sky in the city; a garden. It is a Babylon garden, but it became, of course, very exclusive, but still people want to have their indoor terrace because in the winter, it is not very good to go outside. How do you keep that? It is architecture integrity as well as physical and technical.

#36

In terms of technical, they have started to do reinforcement. So we raise the question and we say how can we help? We had this meeting. You can see some of our colleagues up there. There is Michel Cotte, who was in Doha. You could see Michel Cotte, is the ICOMOS advisor, who developed the concept of integrity as part of the guideline. We were there at -25 degrees on top of

Silo 5 to discuss profound ideas. Sometime, we just do not go to the restaurant to do that. We have to go do a little exercise.

#37

This kind of concept, we had the flowchart of our gentleman colleague from the Vice Governor, which I still have to meditate a little bit on. This is another one. I am still finishing that one, and it is the different dimension of integrity. How does it apply to silos? There are some people who favor strategy of keeping only the metallic section because it is the most precious from the history of technology. There are some who say this is *an assemblage ((セッション 5 英)02:03:37)*. There are some who realized that there is, behind the silo, you see from the city, there is the conveyor behind it. These different degrees will have to be discussed; how do you deal with the machinery inside. How do you deal with the railway network that is still associated? These are the carts that carry wheat and produce from the prairies. The railway is still there. Should it be part of a property called Silo Number 5? How do you secure it so that people can accept the site and not be crushed by trains?

The authenticity benefited from the discussion, and the word 'authenticity' is the notion of truthfulness and credibility. It is how the heritage is a vector of these qualities. For integrity, it is not so clear, but the physical condition. Whereas the authenticity had to do with the heritage as a source of something, in the case of integrity, it has to do with itself. The issue of maintenance is there. The discussion we had in the Montreal session had to do with a bit like what Neil said yesterday. What is the intent? However, also, what is the heritage; what is the real heritage property? Talk less about the history and more about the thing. As for the structure, is it the structure, is it the system in which functional and visual relationship can be important? Is it the site? The question is that we have to start the work plan to address the issue of concrete conservation.

There are many focuses of research, but it is mostly in industry, that is, engineering, transportation driven, and somehow we have to make the bridge with the heritage sector. For that material, ICOMOS is still dragging on that, and we have a capacity. The issue of functional link: there are some guidelines to develop there. The idea of developing or adapting tools, inventory were traditionally made on criteria of history of art, and history of architecture. We need, perhaps, to introduce the notion of 'real condition'. We do not place value only what was very important, but what still important today. The issue of collegial value statement, this connects to this shared management.

I will take just example here of a tool that was developed for the subway system in Montreal. The whole system has got the heritage statement, and then individual stations have got heritage statements. All of this was developed by scholars, by the manager, by the engineer, and by the civil society. There is a college that developed these things, so the agreement on the future is more strongly rooted in society.

#46

This is an homage to our dear Koko. This is Beauharnois, our power station in Montreal. It is almost two megawatts. It was done in 1929, 1932, and it is a kilometer long. It required a canal to bring the water which had 15% more excavation than the Panama Canal. It is a wonderful piece of

achievement, but it is also a great element; a gateway to the history of the continent and the history of the site of Montreal.

I would like to thank you very much for your patience, Mr. President, for your extension of by a few minutes, and this is our dear Silo 5. This is my wish. Thank you very much.

(Martin) Thank you for the inspiration. Are there any quick questions? I can imagine lots and lots, but I also can hear people's digestive systems starting to imagine lunch. If there are no immediate questions, I would like to bring this session to an end, and thank the speakers once more.

Session 6: Abandoned Industrial Heritage Site (Gunkanjima)
Chairperson: Yasuyoshi Okada (Professor, Kokushikan University, JAPAN ICOMOS Vice Chairman)

(Okada) Now, we would like to start the afternoon session. This session, we will talk about how to preserve Gunkanjima. There are many speakers. I am the chairperson from Kokushikan University, my name is Okada. My expertise is a totally different field. Ancient Western Asia civilization is my expertise, but I used to be a member of ICOMOS and I wanted to help with your efforts for Kyushu-Yamaguchi industrial revolution world heritage nomination. In that connection, I am acting as the chairperson of this session.

First, everyone knows the Gunkanjima, so maybe I do not need to explain the purpose of this session, but just one thing I would like to convey to you, that is this Gunkanjima, or Hashima is another name for this, among the industrial revolution assets, this is a very important component part but in the logic of promoting industrial revolution heritage as world heritage, the state of for Gunkanjima's state today, it is not incorporating everything into the logic of the world heritage. It is like much of the concrete architecture, residential ones are built during Taisho and Showa periods and abundant ruins are visible, but this is not directly connected to the evaluation as to the world heritage.

And the Gunkanjima, Takashima including Nakanoshima, these three islands constitutes Takashima coal mine. Gunkanjima is a part of that. Nagasaki City conducted the survey for preservation and also the future plans. They are now in the process of formulating such plans. It is including all those three islands. That is another piece of information that I wanted to convey to you.

We have many speakers and very limited time for each speaker like 10 minutes or 15 minutes. Now, without further do, I would like you to meet the speakers. We would like to introduce in the form of a self-introduction. Ms. Kuon, please.

Community's Memory
Yuko Kuon (Gunkanjima Concierge)

Good afternoon, ladies and gentleman. My name is Yuko Kuon from Gunkanjima Concierge.

#2

Memory of Gunkanjima: Gunkanjima has been 40 years since its closure and Gunkanjima

Concierge is a company, but aside from that, we are organizing committee, and we conducted several activities. Gunkanjima Concierge is a boat company, and Gunkanjima Concierge is a guide for Gunkanjima, so in order to convey deep understanding of Gunkanjima, for those who come to Gunkanjima on a tour, we have to provide a lot of information. That is how we run our company every day.

#3

Originally, about 12 years ago, we met with Ms. Koko Kato and Professor Smith and the industrial heritage, when many professors visit the island, we conducted study sessions for the last couple of years.

#5

The World Heritage Seminar was held in February 2012 and March02013, Professor Oglethorpe, Professor Newman, and Professor Smith joined us and welcomed them as a Nagasaki citizen. As it says here Welcome to Nagasaki

#6

Also, Sakubei Yamamoto exhibition; this is the Memory of the World and our museum received this event when they came to Nagasaki.

#7

Hashima, 40th anniversary of the closure of Hashima coal mine. Back then, those people who were working there, the average age was 43 years, and 40 years since, so everyone is over 80 years of age. Probably we were not able to listen to them or interview them, so we got together for the first time with Hashima people and we were able to conduct the memorial event. This is the press conference there. Many mass media people came and this attracted a lot of attention. Forty years ago, January 15th was the closing ceremony and we had the press conference on the same day this year. Since January, we are shipping company or boat operating company, and many people are from Hashima Island, and we conducted questionnaire survey since January and also interviewed them, and also those people who have photographs donated their photographs. I took several years for this preparation.

#8-9

In April 2014, Hashima Coal Mine History, Kyoichi Nakamura is a famous professor who conducted this historical research. That presentation was made in Nagasaki, so in June, sponsored by prefecture of Nagasaki, in the historical museum, he conducted exhibition of the historical assets, and the Grand Hashima exhibition, the photo exhibition was held.

#10

Nagasaki Shinto Seinenkai or Young People's Association wanted to perform a shrine festival and Hashima executive committee also cooperated with them to conduct this event.

#11

They made a report to the mayor of Nagasaki and the citizens of Nagasaki cooperated with us as well.

#12-13

July 1st to July 13th, Hashima exhibition was held in the museum and Professor Akui's model made a homecoming to Nagasaki after absence of 40 years. Everyone was happy. The visitors took many photos of this model. Former residents of the island came to this photo exhibition. This old man is 88 years old. He came from Osaka and during Meiji period, he talked about this father who was involved in construction of the revetment. Many people donated many photos to be exhibited in this exhibition.

#14-17

After the executive committee was established, the number one purpose is those people who are working there wanted to make a homecoming visit. I thought would not be possible, but more than 40 people made a homecoming visit to their old residence which impressed them very much. And also during the party, the Secretary General of the Labor Union of Hashima also participated. Towards world heritage inscription, he strongly hoped that this would be the case. And also we had a very good party and Hashima song was sung by everyone participated before they went home.

#18-20

It was followed by a symposium on the following day. Professor Akui and Ms. Koko Kato attended the symposium as well. It was very successful.

#21

The biggest achievements, 1,000 copies of *Great Hashima* were made. All the photos of that photo exhibition were compiled into this book, 150 photos, and *Four Seasons of Gunkanjima* is a color, 8 mm film. There was somebody who possessed this 8 mm film and we edited this DVD and made 1,000 copies.

#22

Also, *007* made Gunkanjima very famous overseas. After that, we received many media visits like five times a month including Japanese media. It is now attracting a lot of attention.

#23

Next year, this is the animation of *Shingeki-no Kyojin (Attack on Titan),* a very popular animation as well as comic book. We are now coordinating with this film. At the same time as becoming a world heritage, this movie will be released. This will be motivating young people to visit Gunkanjima even though they have little knowledge about Gunkanjima.

#25

Forty years after the closure of Gunkanjima, those people who grew up in Hashima and also researchers, everyone got together towards one unified goal and they brought a lot of films and materials and this is the first viewing in public. Please enjoy.

<Video Playback>

(Kuon) Thank you very much.

(Okada) It was a short movie but a very impressive one.

Now, we would like to move on. The next speaker is Mr. Kengo Iwamoto, counselor of Japanese Cabinet Secretariat. For this world heritage nomination, he has been playing a very important key role.

Gunkanjima's Conservation as World Heritage

Kengo Iwamoto (Counselor, Japanese Cabinet Secretariat, Japan)

#1

This slide is the photo of Gunkanjima. I am here to tell you about conservation of world heritage value of Gunkanjima. This year, the Government of Japan presented to UNESCO the nomination file on the Sites of Japan's Meiji Industrial Revolution: Kyushu-Yamaguchi and Related Areas to be instituted on the world heritage list. Actually, I am in charge of this nomination.

#2

Sites of Japan's Meiji Industrial Revolution: Kyushu-Yamaguchi and Related Areas comprises single ensemble of industrial heritage sites that represents the first successful transfer of industrialization from the West to a non-Western nation. From the middle of the 19th century to the early 20th century, Japan achieved rapid industrialization that was founded on the key industrial sectors of iron and steel, shipbuilding, and coal mining.

The initial phase, as you know, was one of trial and error experimentation in iron making and shipbuilding, based mostly on the western textbooks, and by copying examples of Western ships. This was followed by the more successful importation of Western technology and the expertise to operate it. By the late Meiji period, there was full-blown industrialization through newly acquired domestic expertise and the active adaptation of Western technology to best suit Japanese needs and social traditions. This successful industrialization was achieved in just a little over 50 years on Japan's own terms. The nominated property is testimony to this unique phase in world history.

The nomination property is a serial nomination, which is a series of 23 component parts, which are grouped in 11 sites and located in eight areas. Together, the property is a single ensemble of industrial heritage sites that contain key attributes of the first successful transfer of industrialization from the West to a non-Western nation from 1850s to 1910. Takashima coalmine is one of these 11 sites. Takashima coalmine, the site, consists of two component parts, Takashima coalmine here and

Hashima coalmine. Hashima coalmine is one of 23 component parts.

#3

This is the map. Takashima coalmine, 6-6 on the map, is located on Takashima Island that is 14.5 km offshore from Nagasaki port. Hashima coalmine is located on Hashima Island that is located just over 2 km southwest of Takashima Island. The operation of Takashima coalmine and Hashima coalmine were based on the Takashima coal field, the same coal field.

#4

This is Takashima coalmine's old photograph. Takashima coalmine developed from 1868 was the first Japanese coalmine to be worked with Western technology and it was the biggest producer until the late 1880s in Japan. The steam-powered mine was acquired by Mitsubishi in 1881.

#5

Next one is a photo of No. 3 vertical shaft in Hashima coalmine. The nearby Hashima, Gunkanjima, was acquired by Mitsubishi in 1890 where Japan's first successful undersea mining was pioneered in 1895. Experience gained during the operation of the Takashima coalfield, including Takashima and Hashima, laid the foundation of modern coal mining in Japan, and subsequently diffused to Miike and elsewhere in Japan and Asia. Takashima coalmine and Hashima coalmine show significant chronological development of industry and technology. They together support criteria 2 and 4.

#6

This photograph is remains of the brick-built general office near No. 3 vertical shaft in Hashima coalmine. Hashima coalmine will be designated as a national historic site under the Law for Protection of Cultural Properties. In Hashima, three kinds of attribute contribute to OUV, the remains of Meiji period production facilities of course attributes to OUV. In addition, remains of the Meiji period sea wall and the island itself, including artificial land created by the mining process attributes OUV as well. They are in a ruined condition like this in varying degrees of physical decay. Some underground archaeological remains are not yet researched in detail.

#7

Some parts of Meiji period sea wall are located within reclaimed land, other parts face the sea. In order to conserve physical attributes in the component parts that contribute to OUV, research on the causes and rate of decay in the aggressive marine environment is ongoing, the research is ongoing, and the research will inform the conservation measures being developed within the context of the conservation management plan. Preservation measures such as continuous monitoring, maintenance, and the implementation of conservation work is going to be conducted.

#8

This slide is the whole island of Hashima. As I told you, Japan's successful industrialization was

achieved from 1850s to 1910. Post 1910 remains exist. Post 1910 remains do not contribute to the OUV. This is an important point. On Hashima Island, remains of post-1910 products facilities and post 1910 residential buildings exist. They do not contribute to the Outstanding Universal Value of the Sites of Japan's Meiji Industrial Revolution. They are directly associated with the later development of coal mining there after 1910. It is a very important value.

I would like to inform you that it is impossible nor desirable to segment the whole area of the island for drawing boundaries of the component part of the property because remains which contribute to the OUV are located all over the island, and the physical island itself including most of the artificial extensions is of course also an attribute of OUV. For these reasons, the whole area of the island is included within the boundaries of the component part of the Sites of Japan's Meiji Industrial Revolution.

#9

Now, I would like to make it clear that the remains of the post-1910 production facilities and post-1910 residential buildings do not contribute in Outstanding Universal Value. However, they will be protected under the Law for Protection of Cultural Properties and conserved in order to conserve the value of the continued history of coal mining on the island after 1910.

#10

Nagasaki City will regulate activities that may otherwise impair the Hashima coalmine's settings as industrial heritage that contributes to the property's value. This policy is very important in relation to World Heritage values. Nagasaki city will not engage in any restoration or full-scale disassembly or repair whatsoever, so as not to improperly contravene the preservation of the Hashima coalmine's overall location environment and settings as industrial heritage.

Now, I finish. I will turn it back over to Professor Okada. Thank you.

(Okada) Thank you very much. Later on, probably you will have some time left for additional remarks. Next is from the Japanese Agency for Cultural Affairs, Mr. Shinichiro Yamashita, 'Direction of Preserving Gunkanjima as a National Historical Site'.

Direction of Preserving Gunkanjima as a National Historical Site

Shinichiro Yamashita (Senior Cultural Properties Specialist, Monuments and Sites Division, Cultural Properties Department, Agency for Cultural Affairs)

I am a senior cultural properties specialist of Agency for Cultural Affairs. I am Shinichiro Yamashita. Gunkanjima and the Hashima coalmine, I am in charge of Hashima. Protection measure and preservation management of Hashima coalmine site as a national historical site by the Act on Protection of Cultural Properties is the title of my talk.

#3

First, the preservation of Hashima coalmine including Gunkanjima. According to the act, the

Minister of Education, Culture, Sports, Science and Technology can designate national monuments among those monuments which are important as national historical site, which has to have academic importance. Also, there is the council as mentioned; the council for cultural affairs made the report that they recommend the Takashima coalmine site to become the historical site.

#4

What you see here, it is three locations which will be included in the national historical site, Takashima site, Nakanoshima and the Gunkanjima (Hashima coalmine). Those are the three locations.

#5

After becoming a national historical site according to the Act of Cultural Properties, when changing the present condition, they have to obtain permission by the Director-General of the Agency of Cultural Affairs along with other regulations. It is a scheme to protect old sites, or national historic sites.

#6

Also, the development and the utilization of the designated historical site, who will be the lead in this action? According to the act, the owner or management entity will have to engage in the management and the restoration. The Agency of Cultural Affairs, the owner and the management entities conducting restoration, subsidies from the national government is available for such activities for the development and utilization by the owner and management entities, not only repair but also facilities for utilization, for example, resting house, guidance facilities, and guide signboards. At the Agency of Cultural Affairs, these management and restoration, maintenance and utilization of historical sites, the technical matters as well as financial help is made by the agency.

#8

Next, Gunkanjima (Hashima coalmine); in line with Hashima coalmine, what kind of preservation actions will be taking place? First, the preservation management, I would like to talk about the background of reviewing of this. As Mr. Iwamoto mentioned, the basic ideas about preservation, the Nagasaki city formulated a report of investigation of Takashima coalmine as of March 2014. This was the result of a 3-year work.

At the city of Nagasaki, it will be designated as a national historic site soon, and they are now engaged in the work of formulating the management basic policies. In the Japanese historical site or the national historical site, after the designation, the preservation management plan has to be formulated. The Agency for Cultural Affairs makes a request to each of the municipalities to fully engage in the preservation plan. That is why this Nagasaki city is now in the process of formulating such a plan. Today, based on what is happening with City of Nagasaki in terms of formulating such a plan.

#9

I would like to talk about the preconditions for the preservation of Gunkanjima. There are two; one is since Meiji period to 1974, the closure of the coalmine, at each period regarding the coalmine, ancient structured remnants are existing and preserving them appropriately as well as utilizing them appropriately is one of the principles. Second point, as a matter of fact, after Taisho period, the reinforced concrete structure which is built after we are in Taisho period, it is a very harsh location environment facing the outer ocean. The drastic deterioration took place since the closure and it has been more than 50 or 60 years which is the guideline of the endurance. So, we have to consider those points.

#10-11

Inside of the historical sites, we would like to divide the component elements into two categories. One is components exhibiting the essential value, as you can see in these photos. Gunkanjima's location and the land of Gunkanjima itself as well as surrounding revetments structures, together with the development of Hashima coalmine, this was built as well as extended. It is very important remains. Also, production facility site is located on the eastern side of the island. The production facility site is an important structural remnant exhibiting directly the mining business which took place here.

#12-13

The second component is in addition, the elements which closely connected to the essential values, elements. This is the remains of the residential complex which is located on the western side of the island. Together with the production facility, it constituted Hashima. Reinforced concrete, high-rise buildings were constructed. Super-densely populated residential area was formed in the structured remnants. These are the residential facilities.

#14

Like this, those are the two major component categories. How to handle this is what I am going to talk about next. First, essential value exhibiting components: of course, this principle trying to make it fundamental to preserve the present status, not damaging its value. Secondly, from now on, more detailed deterioration diagnosis to be carried out, and then protection measures, how to handle protection measures. We have to consider each on a case by case basis among the production facilities. The very important one like coal mining, coal stocks, coal preparation, we prioritize them giving higher priority to the remnants which shows important work contents in dealing with the life extension measures gradually.

#15

Just like residential facilities, which are components closely related to the essential values. In the Nagasaki studies, these are the philosophy that they are employing. Representative residence or today's Hashima's residential facilities which are contributing to the formation of the total landscape of Hashima, we will have to extend the life of them. The first one, representative one or contributor to the formation of the total landscape, other facilities or essential facilities, we will aggressively collect

data and we will continue monitoring of the deterioration or corrosion.

#16

Lastly, other points to be noted. Today, we have not developed epoch-making technology fundamentally stopping the deterioration of reinforced concrete structures, but in the future when we do have such technologies, it is important for us to update the policies that I have mentioned. The preservation technology of reinforced concrete structures is a very important challenge in terms of preserving modern remains. Currently, remains of modern time, this has become a very important topic. Therefore, related agencies as well as related academic societies, it is important that we will cultivate this area as well. This is all I have. Thank you very much for your kind attention.

(Okada) Thank you very much Mr. Yamashita. There are still some challenges left. Next is Professor Emeritus of Architectural Department of Tokyo Electric University. Professor Akui is going to talk about the decayed buildings after the closure of Hashima. He spent many times in Hashima.

Gunkanjima's Full Survey

Yoshitaka Akui (Professor Architect, Tokyo Denki University, Japan)

Thank you very much for your very kind introduction. I am Akui. I am not an expert of coal mining. I am an expert of architecture and urban designing or research. These are the areas of my expertise. When I was young, I spent some years living in Europe, and whenever I had some free time, I went to the Mediterranean coastal cities and areas. Back then, those settlements which existed in the Mediterranean sea coast were not known by the Japanese people, but then there were many settlements which had very high population density like buildings on top of each other almost, and I thought that this was a very important model for the future residents of human beings, and because of that connection, I went from the Mediterranean area to the oriental area. I basically covered the entire area between Japan and Europe, going all of those settlements in between one by one. Not in one shot, but one by one.

When I was doing that, Gunkanjima, officially named Hashima, was reported to be closed. But 10 years beforehand, I was looking at that island from Nomo peninsula and I wondered what that island was, and I heard that there were about 5,000 people living there on that island. That was the kind of preliminary information I had. Ten years later, I heard the news that that island was going to be closed and it was going to become no-man's island. There was no Shinkansen or no plane available to reach Hashima. I took normal train to go to the island and I was in time to take a look at the closing ceremony, but I was overwhelmed by the impressive buildings on Hashima. Back then, there was no written material available; even if there was, I think those relevant parties keeping those materials would not have disclosed such materials anyway, so could you please take a look at this handout? This is something I would like you to look at maybe later on.

In any case, since the closure year of Hashima, every year, I spend the summer taking my students who are writing graduation papers, sometimes 10, sometimes more than 10 students, and spend around

10 days each year. Takashima coal mine was not closed yet, so we would stay on Takashima to sleep over. I did that for 10 years and I got a map of Hashima. I got section drawings and other drawings of those buildings prepared by myself and for me by others. There is a book which is displayed outside of this room. That is the book that I wrote after doing such research for around 10 years. This is how the space is organized in these buildings, but every year, I go there, I would see more and more decay, and there was also under-the-sea structures that were also getting lost.

Because I am an architect and I am an expert in that area, of course I understand that coal mining played a very important role as a core industry in the Japanese industrial revolution, and especially coal mining supplied very high quality coal to steel industry. At the time of the industrial revolution in Japan, coal mining industry made great contributions. That I understand. However, because I am an architect, I took different perspective. For instance, per hectare population density usually does not exceed 1,000 persons; however, in Hashima, that population density was 1,300, very high density. Kowloon in Hong Kong, the settlement is not there any longer, but per hectare density there was over 2,000. That was very high, but in my view, that was not a town, that was just kind of like a slum. It was just for the people to go back to sleep. It was not a town because a town is something which has some public facilities such as hospitals and schools. From that perspective, the highest density city in the world should be something which needs to have any functions that need to be there for a town, should not be a slum. A city needs to have all the facilities necessary for the people to go through the cradle to the grave. The graveyard was there on Nakanoshima Island, so every function that is needed for a city was there. With that definition, the highest population density was there on Hashima.

If you go there, you would understand, but if the wave is a little bit high, you cannot land on Hashima or those workers I think commuted sometimes from Nagasaki city, 24 hours operation with three shifts does not work if there is a wave that prevented people from commuting from Nagasaki to Hashima, so that was the condition under which people worked.

That was unthinkable and that was almost like inhuman condition. Under such condition, the highest reinforced concrete buildings were built every year, one after another, eventually accommodating over 5,000 people in such a small space. That is why that was the city with the highest population density. It is not just a group of people living there, it was a city. In that sense, it is a very rare existence that we do not find elsewhere in the world. What is the value of these remains? The coal mining was sustainable only with the existence of the remains of those facilities and buildings, the highest population density in the world, how people actually lived there? That is something we have to look at because the problem is something we may face in the future. The population density may rise in Tokyo even further, so how a city should be? We could probably learn from the lessons of Hashima, and in that sense also, Hashima is very valuable.

Because I am an architect, I can talk a lot about architecture. Talking about history of reinforced concrete, this technology started in Japan as well as elsewhere in the world almost around the same time. The steel structure was more advanced in the west and in the Meiji era Japan learned from the West, but when it comes to reinforced concrete, the advanced European nations as well as in Japan, we had more or less the same history of development through trials and errors. Such coincidence of the history of reinforced concrete structures in Japan; in any case, everywhere in the world, reinforced

concrete is a very important element in the development of modern architecture itself.

When modern architecture was born, you know the very famous French architect, Le Corbusier, who built the museum in Japan; when he was young, he came up with a theory called domino theory which means that in Europe they had buildings based on stones. In Japan as well as the entire East Asian countries, we have columns, we have beams and we have floors. Le Corbusier, for the development of modern architect, and he is considered as the God of modern architect, came up with the theory of domino. That was around 1910. Ten years before that already, there were those buildings on Gunkanjima meaning that the Japanese people did not simply copy these modern buildings from the West. I think Japan was ahead in the way that those modern architectural buildings were built to accommodate lives of the people.

I guess the time is up. There are some handouts that are distributed to you so please take a look at them later. Thank you very much.

(Okada) Thank you very much Professor Akui. As a city, it has all the functionalities that were needed.

From Professor Emeritus of Kyushu University, Professor Mori will talk about preservation of the production facilities.

Conservation of the Remains of the Production Facilities in Hashima Coal Mine (1)

Sukeyuki Mori (Professor Emeritus, Kyushu University)

My personal history is here, in Japanese as well as in English, 1939, currently 75 years, and Kyushu University, joined mining engineering, Bachelors, Masters, and Doctorate, and then lecturer, associate professor, professor, and now professor emeritus.

Now I lecture coal preparation technology in Japan, its people, its environment. There is also Japanese in the handout to you, English followed by Japanese, and we have our full paper available in Japanese as well as English; if necessary, Chinese, Indonesian. It has been translated into those languages. I would like to just explain the beginning portion. This is the English one and this is my philosophy although I will talk about different things.

The Resources Processing Society of Japan which was held in 1998 100th commemoration and coal preparation technologies. When I authored this paper, state-of-the-art machines, coal preparation was used by whom and where, but as I went through the literature, Miike and Takashima coal mines, those two were totally different technologies in terms of preparation. Miike pursued the latest state-of-the art coal preparation machines, but Takashima coal mine used hand picking method at that time Miike and Takashima were in fierce competition for Shanghai market. As a result, they fought each other and Mitsui and Mitsubishi and also Japan, they accumulated the basis of the capital.

Therefore, I was interested in the differences of the latest technologies of those two companies and the people and the societal environment was studied. What I saw was people's enthusiasm for modernization and anti-colonization, acquiring foreign exchange and also strong country and strong military, rich country and strong military, but as a result, we lost World War II. After the World War II, people were enthusiastic about recovery and we were successful in achieving recovery after World War II.

But, about 16 years ago, the bubble economy collapsed, and the second loss in the economic war, well, economy is just the method, tools, not the purpose. What was the purpose of recovering the economy? In order to recover from the second loss of the war, we have to look back on the history of coal. That is how I authored my paper. Based on this paper, I gave a lot of talks in this conference and I will not talk about this today because everyone has different value orientation. I am standing here, this is myself of today, but here, since my childhood, I have tomorrow, I will eventually die. People die, 100% fatality, so which stage do you take? I am Mori, but where, what state of myself? I would like you to know of me, just now. Mines have limited life, industry has limited life, then what, how, where do you leave something? That is the topic of today. What, how, what do you leave behind?

This happens to be world heritage. Another thing is that coal is international product and mining technology is also international, it is not only by Japan. This is an international history. It just happened to be taking shape at the time of the closure of the mine. This is the remains of a photo. I take a picture of myself, but I am still alive.

Here, this is what is still remaining and I put here coal preparation plant. The word, "coal preparation," as a matter of fact, we do not have a Japanese equivalent. Foreign visitors know what this is all about, preparation, how to translate this into Japanese? That was very difficult and that is here. At the time of occupation forces, Pauley tried to teach the Japanese word corresponding to this that was not understood. Not only the words, but we have to consider the actual things for discussion. Coal preparation, the technical assistance guidance by the occupational forces, what is the Japanese translation of coal preparation? Japanese translated, what this means is that it is preparation, so there should be some customers. For customers, we prepare something for our customers. That is what coal preparation is about, but what was the Japanese term? *Sentan* (separation) was the term. I only use English word, coal preparation. We use Katakana letters like clean coal now. Maybe we should have used Katakana letters, but at that time, we have to use Kanji. What Takashima or Hashima was doing was handpicking. They wanted the lump coal. It is a boiler for steam engine, so lump coal was needed of a very high quality. Just like this, and they were doing handpicking and also hand sieving but Miike used these machines, Trommel screen or Grizzly screens. On the other side, even old lady handpicked. They have so much free time, and old ladies were working even inside of the ship, so machine versus hand. Mitsubishi established modern structure.

Then coal preparation also developed into today's, and state-of-the art technology still remains, but new coal mines use state-of-the art one after another, so nothing is left. When I am dead, everything I have will be gone, so if that is the case, then for coal preparation here, what is this? It is *sentan* (jigging). Jigging is what I am going to explain next. This one, inside of water, the coal is moved and the light ones float, heavy ones sink.

This is the jig or jigging operation. There are a wide variety of shapes, and this was the one, German Baum jig remained. This is the newest one. Nothing is needed; as long as there is a stack, we know what this was, just as architects need columns. Also here, flotation machine and coal preparation, we prepare coal for customers, first lump coal for steam boilers. Mechanical stoker utilizing fire, this was one of the important things of the industrial revolution becoming bigger.

What is next? Coke was needed. For coke, not big ones were needed, but powderized coal was

needed and the machines to select powders were required. That is here, and bubbling from the bottom, and then, the coal float together with the bubbles, so a froth just like when you drink beer, so when you drink beer, please remember this one. This is Hashima. Look at this location in Hashima. When you drink beer, please remember about Hashima.

Next, de-filtering; we have to get rid of water, and this is de-watering facility. What is here is a water processing facility Dorr-thickener. This is a round shaped, we have to process water to clean the water. There are the columns there, and from here, the coal was dropped. Depending on the type of coal, depending on the customer, this is according to the calorific value that such preparation was made. For that, transportation took place. Lastly by the crane, it was loaded here. With this, then at the time among the world technologies, it is clearly showing the technology back then. This is the highest level of technology in Japan and also the highest level of technology internationally.

How we can preserve that? My expertise is technology, therefore as technology, these are the technology remains and Dorr-thickener can just sit there, that is all it takes. That is my topic.

I thought I was going to finish it, and English is also prepared, but scholar has to present something new material evidence thinking based on actual things and also utilizing history for tomorrow's world and we have to preserve those things. Thank you very much.

(Okada) Thank you very much Professor Mori. Miike and Mitsubishi, difference between those two that was very clear.

The following speaker is from Japan Coal Energy Center, Mr. Masafumi Uehara. He will also talk about the production facility conservation.

Conservation of the Remains of the Production Facilities in Hashima Coal Mine (2)

Masafumi Uehara (Head, Resource Department, Japan Coal Energy Center)

I would like to talk about the production facility conservation of Hashima coalmine. I am Uehara from Japan Coal Energy Center. The predecessor of Japan Coal Energy Center is Japan Coal Association, so there were about 500 coalmines or about 200,000 people working. Now there are about 50 people only from the upstream, from the excavation to the coal based thermal power generation downstream, there are only very small number of people working there.

Now, talking about what kind of mining technology was available, preparation of the coal was already covered by Dr. Mori, so I would like to talk about the mining technology and transportation of the mined coal.

#2

This is the technological progress chart. In terms of Hashima, Mitsubishi bought this in 1890. Since then, Hashima-Takashima, and in between them, Nakanoshima these three islands, first, there was a discovery of outcrop and then from there, for around 100 years, coal was mined there. This is a rare case also in the world and the value of this heritage is very high.

#3

When the development of coal mine started in Hashima? The first shaft or shaft No. 1 was excavated on the northern part of the island. The size of that was 36 meters in depth, and the shape was rectangular, 4.2 m by 3.6 m. This is just average size. And then later, the shape became round and then it became bigger. From the shaft, they made rows. That was like modern type of coal mining developed by Mitsubishi.

Outcrop is a kind of coal that is sticking out from the soil so you could see that and from there, you excavate. And then, the biggest problem is water. Water starts to leak and then it has to be removed otherwise everything sank. But after the Meiji restoration, from the West, we were able to import the state-of-the-art technology of steam. Steam engine pumps became available to remove or drain the water. At the beginning, there were two boilers and three pumps for drainage; 36 m was the depth of the shaft. To get water out of that depth, every minute 1 ton or 2 tons was pumped up.

In 1890, Mitsubishi bought this coalmine and for some time, the production was halted, but then it was resumed later. The second shaft was excavated in 1893 and it was completed in 2 years or so. The depth was 162 m and it reached the coal seam there. The third shaft followed in the following year and it was completed within two years or so. The depth of that shaft was 198 m.

#4

This is what we call columnar section of the coalmine. Usually, there are several coal seams but then in Hashima, there are many different types of coalmines. As you excavate it, you are able to find these coal seams. These are the shafts No. 2 and No. 3. Those shafts need to have air and people need to go down and coal needs to be carried up. These are like elevators. They go up and down to carry people as well as coal. Talking about location and this overlaps the map of Professor Mori, but this was where No. 2 shaft was. This is looking at the underground mining structure. The shaft was here, and from here like in a radius manner, there were those rows running.

#5

How coal was mined? Back then, room and pillar was the method used. This room and pillar method is not much different from the one that is applied now. Every 30 or 40 m, there are rows and then these pillars that remain, these are mined or excavated. This is what we call split of the pillar and excavation of this follows. These are rows. In the case of coal, it is like layer after layer. Therefore here, the roof is very vulnerable which required some kind of support. These are what we call wood support. In the mining pit, there need to be a lot of wood support. These are beams and these are legs. These are needed for split of the pillar. For excavation of the pillar, we create this kind of wooden structure to keep the roof from coming down. This is the rock that is fitting the inside of this wooden structure. This is coal and this after excavations. This is how it worked.

#6

In the case of Gunkanjima-Hashima, the coal there was very prone to firing or combustion. The coal contains a lot of methane, and especially in Hashima, that coal was methane rich. The rock was pretty soft. It was a soft rock, pretty vulnerable. When we excavated, the excavation of the pillars, we could not get all of them out. There were some remaining or un-mined pillars.

The quality of the coal itself was pretty good but then it was a difficult operation. The inclination was around, on average, 40 to 50 degrees; however, the highest output there was 400,000 tons at the peak time. I think this represents unyielding determination of the people who worked there to overcome any difficulties they faced.

#7

These are the tools used. These are like drilling tools. Dynamite and gunpowder were also used from the beginning. These kind of drilling tools were used to make holes and then put gunpowder in the holes. The coal produced was carried in this kind of bamboo tree basket. When the roof could be vulnerable, we go from the top to the bottom, for excavation.

#8

This was the time of Taisho and Showa. This is the method of mining which is still used and this is called a long wall system or long wall method. Before that, the method was room and pillar method. This long wall system or method is different. There is a long wall here and in each space, excavation takes place. And then of course, once again, these wooden structures are there. The coal seams, the oblique ones, there is a tunnel that is made to reach those coal seams, and then on this horizontal axis, there is a belt conveyor which is a modern facility to carry coal.

#9

Modernization of that mining method: I am sure that are engineers coming from the West to help, to educate the people in Japan. Blasting was done using gelignite manufactured by Nobel Corporation. In 1900, General Electric Corporation (GE) from the United States already had direct current generator which was used in this coalmine. In 1900, lighting was introduced inside the pit and outside of the pit, and in 1904, Endless was also introduced. This is a wire which is turned around a wheel. As I said, steam based pumps were the ones used at the beginning, but then in 1910, the electrified pumps were introduced, and also electrified winch or electric powered winch was introduced in 1911 as well.

#10

What is important is to drain water from the pit. In the past, these kinds of water wheels were used or those kinds of buckets were used to get the water up from the shaft. But then, steam engine pumps became available and also turbine pumps became available to remove the water from the pit in the later years.

#11

Methane gas needs to be removed as well. We boil the water, 15 percentage, and that percentage has to get down to 2%. For that, what is important is ventilation. Back then, there was a boiler here to supply wind. And then, this shaft is partitioned in between, and then on the right hand side, this half is used to intake air and on the left hand side, this is for exhaust of air. In every row, we need to supply air or wind. For that, we create those so-called air doors to prevent air from going to certain

directions. For instance, this road; here is a kind of curtain and then the wind comes here and then goes to here just a little bit. The amount of the air which goes to this direction is controlled and then the wind comes down here and then it turns left here and then there is a door here so it does not go there, and then it goes to the left and etcetera, etcetera. This is to really cover the entire pit with air.

#12

This is ventilation or air fan from the boiler type to steam type.

#13

For transportation, at the beginning, it was human powered and winch was used later on.

#14

Those are lamps. Inside the pit, it is dark so you need to have some lighting. Before, we had only, what we call naked fire without any cover but then Davy lamp became available to shut down the gas.

#15-16

That is really all from me. Later on, how it developed is like this. From the wooden poles and beams, iron poles and beams, and then these kinds of machineries became available. The winch, very big one, is now available and belt conveyor and also pump station. This is also available. The coalmining is very much modernized and the work there is very different from the past and what was done in Meiji era. Thank you very much.

(Okada) Thank you very much. Truly, all kinds of wisdom was working inside of a coalmine.

Now, as for the presentation, the last speakers, Professor Noguchi as well as Professor Kiyomiya, both professors; preservation technology and revetment preservation of reinforced concrete structures.

Repair, Retrofit and Renovation of Deteriorated Buildings in Gunkanjima

Takafumi Noguchi (Department of Architecture, Graduate School of Engineering, The University of Tokyo)

Thank you very much for the introduction Professor Okada. I am from The University of Tokyo. I am a professor of Graduate School of Engineering. Recently, we conducted several times survey of Gunkanjima. My personal ideas will be presented regarding preservation.

#3

Probably, you have seen this many times. In Gunkanjima, since 1916, reinforced concrete structures were built, a lot of them. Unfortunately, it is not a candidate for world heritage listing, but without these constructions, half of the attractiveness of Gunkanjima or more than half of the attractiveness will be gone, so how to preserve? I am not sure whether I should use the term

"preserve," but how to convey these types of architectures or structures to the later generations. That is what I am considering now.

#5

However, Gunkanjima is facing the outer ocean, very harsh environment. In the time of typhoon, just like this; the sea water is splashed entirely. Reinforced concrete, the reinforcing bars in air, it corrodes. Concrete is providing protection by its alkalinity, but if there is salt, even though it is alkaline, reinforcement bars will be rusted. Every time I visit Gunkan Island, reinforced concrete, iron and concrete coupling or couple, was it an appropriate matching in the modern days, I always have that question. In this severe environment, what is left in Gunkanjima, those architectures or constructed structures, how to convey this to later generations is a very challenging matter.

#6

For wind, during wintertime, very strong north-east, north-north-east wind blows. During summertime, as you saw in the previous photo, typhoon related wind blows. Okinawa is surrounded by ocean, so Gunkanjima is a similar environment compared with Okinawa, but the salt content splashing on the structures are a lot more in Gunkanjima than Okinawa.

#7

How much salt content found in concrete? This is the result. Normally, within concrete, the salt content goes in from the surface and it does not normally reach the center of the column, but according to this data, originally this content might have used seawater from the beginning that amount is found as content. These are the RC structure deterioration situation.

#9-10

Under this condition, how deterioration progresses, I would like to show you some photographs and this tells everything.

In 1916 building, this is the old RC building; it is going inside just like this. The slabs collapsed and beams collapsed in some locations. The remaining beams and columns, oxidized iron is found instead of reinforcement bars. When you walk on here, you have to be really determined. You do not walk on the floor. You have to walk on the beam. We went up to the rooftop. Some researcher actually destroyed one of the stairs.

#11-12

Other structures, number 16 to number 20 buildings, the company housing, at the top, roof was used as a farm. Rooftop garden is greenery type structure as we call it today. Probably, this was the forerunner of that type of construction, and inside, this is the level of deterioration.

#13

Number 65 and number 70 building, relatively recently built, used as elementary school and residential buildings where reinforcement bars are not that deteriorated but the window frame is in a

sad condition, it is gone.

#14-15

Sea-facing side, just like number 30 building and number 16 building, but this is a very valuable one. The assembly method of reinforcement bars which is not used right now, it was used. The interior was not as bad as in the previous cases.

#17

But building number 70, Professor Kiyomiya will touch upon this later on, collapsing of revetment scouring is found, so we have to immediately recover this or restore this.

#18

What is the strength of concrete? It is a wide variety, low strength to high strength. For high strength ones, is comparable to currently used concrete.

#19

The neutralization: CO_2 goes into the concrete to remove the alkalinity of concrete since this is a close location to ocean and concrete is filled with water content, so there is not so much progress of this. While maintaining alkalinity, the salt is the cause of the rusting or corrosion of the reinforcement bars. IR thermography on the right hand side, the surface mortar finishing shows spalling phenomenon. It may drop from above.

#20-21

For this type of constructed structure, how much endurance against earthquake has; that is what I am going to talk about next. This is the condition of the reinforcement bars. It is levels of corrosion, someone is totally cut. The red ones are very much deteriorated and green ones not yet deteriorated. They show different conditions depending on the member of structure.

#23-24

We checked the durability. The method that we employed, we do not have an established system for evaluation for a structure like this. But after the earthquake, for damaged structure, we had a system, so we adapted that.

Grade 3, 4, and 5 for each member or material, we checked the structural safety. For certain structure, major damage, it may collapse at any moment, or even with a minor damaged one, still we can preserve as it is for some buildings, but all of the buildings do not satisfy the present requirements of the building law of Japan or building standards today. Therefore, we cannot continue using these buildings, pretty much damaged ones. Not earthquake, just a typhoon level wind is sufficient to make it collapse. That is our concern.

#26

How should we perform repair, retrofit and renovation? We would like to preserve those

structures. Hiroshima's Genbaku Dome, the resin was injected into the concrete; surface is concrete, but inside all resin, so while preserving this state, it is to be preserved and it has been listed as a world heritage.

#27

In Dresden, Frauenkirche church was totally destroyed during the war. All the brick what was used collapsed and each piece was picked by citizens and reconstructed this. Unfortunately, Dresden, not this one but for modernization, for construction of a bridge, Dresden was the only city that was unlisted from world heritage listing. For development, is it better to be listed in the world heritage or to maintain the development work to advance the industrialization? That is up to the citizens. That is very well depicted by this Dresden example.

#28

Utilizing the latest technologies, we are performing, making safety a lot safer. Probably, we can apply these technologies to Gunkanjima. Various technologies are used for Japanese constructions utilizing frames and tension is used and jacket is used to cover the columns for reinforcement and walls are used for reinforcement. There are various technologies, but it is rather difficult or maybe not appropriate to use any of these technologies for Gunkanjima.

#30

Without conclusion, I have to say conclusion. As a matter of fact, for us, researchers and engineers, these buildings are irreplaceable structures, probably, only one in the world. This much deterioration cannot be found anywhere else. In order to improve durability or preservation, Gunkanjima structures are the only ones that really is a place where we can make demonstrations for preservation technologies. This is a perspective of researcher, but for general citizens, whether it is worth visiting there, the value to visit there lies in the structures. Please provide this place to us engineers of the world, so that reinforced concrete, life extension and preservation will be promoted. We would like to ask for your help in that regard.

With that spirit, since June 1st next year, for three days, we will be hosting international conference featuring Gunkanjima, reinforced concrete preservation, conservation and regeneration. All the participants will go into the inside of the structures of Gunkanjima to observe the actual status and what we should be doing should be discussed. I hope that you will be attending this international conference as well. Thank you.

(Okada) Thank you very much. Next, Professor Kiyomiya. If possible, please utilize only five minutes.

Investigation and Preservation on Historic Concrete Revetment at Gunkan island

Osamu Kiyomiya (Professor of Civil & Environment Division, Waseda University)

I am Kiyomiya from Waseda University. I am a civil engineering expert. I work for marine

aspects. We conducted a survey of revetment. I would like to just briefly make presentation as to what my thoughts are in this regard.

#2

Gunkanjima, as you know already, expansion took place six times to where it is now today.

#3

Every time, the surrounding, we put concrete structures or masonry structures, and currently surrounding is what is visible right now. Gunkanjima: while being expanded, from the point of view, historical value is not reinforced concrete, but center is *amakawa*. This is old structure. *Amakawa* means lime and red clay used as glue for stones. The bottom area, very high level concrete technology was used to build this foundation, and revetment was made on that foundation.

#4

Several photos were shown, here is a very difficult condition, and at the time of typhoon wind attacks, the revetment collapsed and every time the repair work was performed.

#5

Presently, the revetment from outside, it is very nice. We can see the sign of reinforcement. As you get closer, these big cracks found, and here, at borderline with bedrock, there are some voids.

#6

This is upper part of the revetment, older revetment, *amakawa*. You can see the red portion in front and back, so only this will not withstand typhoons, so currently reinforced concrete is used for reinforcement. We reconstructed this area by reinforced concrete as well. This is reinforced, but wave will make them separate, so it is a rather dangerous condition.

#7

The revetment, my concern is, as Professor Noguchi slightly touched upon this point, building number 31 on the west side, the bottom of the revetment is scoured by waves and it is exhibiting hollow condition. This is drainage orifice. While the waves get in and out during the typhoon, it damaged that.

#8

Also, this is the piles of reinforced concrete, very badly deteriorated. Just like a diagnosis, this can collapse at any moment in this condition. That is my judgment as well.

#9-11

Also, this is a very high valued for study or research for this revetment. For reinforced concrete experts, this is like a treasure island. We conducted various surveys like strength of concrete and neutralization, state of corrosion of the reinforced bars during the last couple of years or three years.

The strength of concrete did not deteriorate so much, still exhibiting sufficient strength. Also, as was mentioned earlier, the salt attack from the surface, 20 or 30 cm, the chloride ion is found, but not much neutralization. Only the surface is very much deteriorated, inside not so much. That is the condition. And as was mentioned earlier, the chloride; maybe they used seawater for this concrete structure.

#12-13

Representative deformation; there is a chain of these phenomenon at Gunkanjima. Wave and also overtopping of wave and water getting inside of the island as well as rain water which goes in, and comes out through the drainage orifice. These are the contents or factors for deterioration of the revetment. Then, what situation arises? The collapsing or damaging of revetment.

#14

Conclusion: the necessity of restoration of the revetment. So far, major typhoon damaged the revetments, but from now on, future big typhoons will destroy the revetments and also it will allow the earth inside which is used for reclamation may flow out. We used to restore the revetment every time it was destroyed, but we are not sure whether it is possible or not in the future because of the financial condition. It may change the shape of the island. Gunkanjima, the *gunkan* means the battleship; the belly of the battle is like being hit by a torpedo. Probably it will get damaged just like that.

Also, the buildings 31 and 70 are close to the revetment, it may collapse at any moment. No one should approach, get near those buildings. Insurance company will not pay insurance for you if you get near those buildings and die.

Those void areas have to be filled immediately considering the material and also when the revetment is damaged, how to repair including the decision to do it or not should be considered. That is my thought. This concludes my discussion. Thank you very much.

(Okada) Professor Kiyomiya, thank you very much for your very short and concise presentation. Gunkanjima, it is like an endangered species type of heritage.

We do not have much time left, but on those eight presentations, I really urged to you so strongly to get your presentation done very short. Therefore, I would like to ask you whether there is something that is lingering in your head that still needs to be addressed. If there is nothing from the speakers, I would like to invite some questions or comment from the floor.

Discussion

(Okada) Are there any questions that you would like to ask the speakers? Please show your hand.

(Cossons) Thank you chairman and the speakers this afternoon. Bearing in mind that the Gunkanjima features in the world heritage nomination and that assessors will be looking at it later this year, should the assessor ask the question what is the future for Gunkanjima in terms of its management? What is the current answer that is going to be provided? We have heard a lot of

analysis of the problem that in the Gunkanjima has to have a future, what is the anticipated future, over say in the next 5, 10 or 20 years for Gunkanjima?

(Okada) Thank you very much. I think it is a very tough question to answer. Could I appoint somebody from the speakers to answer this question? Mr. Yamashita and Mr. Noguchi, I would like to take some comments from these two gentlemen please.

(Yamashita) Thank you very much. I think it is a very difficult question actually. I had just 10 minutes to give you an explanation but those are reinforced concrete structures. They are under a lot of study globally, so it is not as if we do not do anything about those concrete structures. Prolonging of life of these structures will be of course necessary and that will be tried. And of course, continuous monitoring will be provided to continue to investigate into the level of decay of these structures.

(Okada) What about you, Dr. Noguchi?

(Noguchi) In terms of preserving them for research and heritage, somehow the silhouette of Gunkanjima to be preserved not reinforcing external but reinforcing internal aspects is something that I would like to perform. Reinforcement by frame is not appropriate as I mentioned because it is visible from outside.

But because of the budget, probably we will not be able to do everything. Also, to preserve the present deterioration condition forever is another impossible thing. Deterioration of reinforcement bars, if that is protected, we can do that, oxygen and water, especially oxygen. Reinforcement bars is not rusted even though there is a lot of salt quantity, but iron still on the surface, we have to just get rid of it, it becomes iron oxide, but the reinforcement bars inside can be preserved not let oxygen go inside. By doing so, we can preserve that.

The surface should be coated; injection of resin is one approach. Somehow if we can preserve that, then for other things which may collapse, I have a desire to see how it will naturally collapse. I would like to continue monitoring in that regard. But since general citizens will go inside and also for us, researchers' safety, strong transparent tunnel would be very much appreciated to be used as a shelter. It is like a dream, but this is probably one of the ways to utilize Gunkanjima.

(Okada) Thank you. Yes, Mr. Iwamoto.

(Iwamoto) Sir Neil mentioned towards the end of this year, the site will have survey or assessment, so how should we respond to such assessment survey? As Mr. Yamashita and Professor Noguchi mentioned, since 1910, concrete structures was the topic of the discussion. But for those, we would extend the life of them as long as possible utilizing the wisdom available around the world. Next, they talked about building international conference. We would like to borrow your wisdom. We would like to cooperate with the rest of the word.

Attributes of world heritage and older than 1910 production facilities and also the revetments

forming the shape of the island and also the foundations and other remains, this is preservation of the present condition as defined by world heritage like we will perform preservation in line with the Cultural Assets Preservation Act. And also, feelings and location, environment to be preserved for concrete structures; preservation technologies, there are many ideas as Professor Noguchi mentioned. Whether each one of those technologies will not destroy the settings, we have to include the verification process like that.

(Okada) It is already break time and you are supposed to be drinking coffee already, but there are many overseas experts of world heritages and industrial heritages, so could I get some ideas from you or any proposal about preservation? You have a question? Briefly please.

(Pearson?) We will be with UNESCO mission in September looking at the site, the ICOMOS mission. The major question I am sure will be asked on the western side of the seawall where there is major collapse worsened by the very recent typhoon, the question will be how are you going to fix this and when? Is there an answer to that or is there a process that we can indicate which will address that very, very urgent issue? It is not one that can stand several years of study. It has to be really solved now or you are going to have that whole western side washed out.

(Okada) I think this question goes to Mr. Kiyomiya.

(Kiyomiya) As I said briefly already, the revetment shape maybe very important to this world heritage, which means that we need to stand on the assumption that it may be eroded by the typhoon and then preserve it. And yes, the situation is kind of really emergency because the next typhoon may already collapse that revetment so we have to repair wherever the most vulnerable right now. Technically, it is not very difficult to do so.

(Okada) Okay, Mr. Iwamoto.

(Iwamoto) As was mentioned, from now on, maintenance activity plan is being formulated by the committee. Very urgent problems like this, we have to hurry, so in that direction, we will implement measures. That is the type of answers that we will like to prepare.

(Okada) Also, this planning committee will take place this month. Yes, Professor Mori.

(Mori) This is very easy. Why? Well, Mitsubishi engineers have been exercising this and those engineers are still alive but very old, 90 years old. He is very skillful. All the Mitsubishi people have been doing this, so let us use them, it is easy.

(Okada) I would like to utilize that idea in our report.

Sorry, there may be a lot more questions and comments, but I will have to summarize the session, but we have run out of time, so I would like to skip the summary portion. Ladies and gentlemen,

please utilize what took place here. We would like to ask for your cooperation for the preservation and the utilization of Gunkanjima. This concludes the session on Gunkanjima. Thank you very much for your kind cooperation.

Session 7: Conservation Challenge of Mining Heritage
Chairperson: Katarzyna Piotrowska (National Heritage Board of Poland, Poland)

(Piotrowska) I would like to welcome you all after lunch break. Before I pass the floor to our distinguished speakers, I would like to introduce myself as I think I am new to the industrial heritage. My name is Katarzyna Piotrowska. I work for the National Heritage Board of Poland where I am responsible for implementation of the UNESCO conventions in the field of culture which is Intangible Convention and the World Heritage Convention. The National Heritage Board of Poland serves as the focal point for world heritage in the country. So that is all about me.

Let us go to the presentations. There is a small change in the way we will proceed. All speakers have 20 minutes each. After the presentation, it is a little bit more than I said before. After each presentation, we will have 5 minutes for questions.

Shall we start with the first one? I would like to ask and introduce Mr. Kazunori Miyahara, the President of the Golden Sado Corporation. He will give us a presentation on Sado gold and silver mine. If you feel like to introduce yourself and give a little bit of information about yourself, you are very welcome. Thank you.

Sado Gold Mine with 400 Years' Heritage
Mr. Kazunori Miyahara (President, Golden Sado Co., Ltd)

Thank you. Good afternoon ladies and gentlemen. My name is Kazunori Miyahara. I am President of Golden Sado Company Limited. Today, in this session, we will be focusing on mining. Mining heritage and therefore from my side, I would like to talk about both silver and gold and talk specifically about Sado Gold mine.

#1

The Sado Gold Mine has 400-year history and the title reads 'Sado Gold Mine With 400 Years' Heritage'. I hope that this gives you a shiny image. Well, this is the Doyu-zan crack and you can see that it is split into half. It is not natural that this happened but in the beginning of Edo period, they were digging manually this mine. It was an open pit, and as a result, it came to look like this. It is an overwhelming scene. But at Sado Gold Mine, we do have such ruins remains, and I would like to introduce them to you today.

#2

Let me begin by introducing our company Golden Sado. We are a sightseeing operator listening from yesterday understand that there is people who are trying to preserve a secure industrial heritage. It is unusual that a sightseeing company is involved, but for 40 years, we have been operating as a

sightseeing business. We are 100% subsidiary of Mitsubishi Materials Corporation. In the next room, they are doing a session on Gunkanjima and Mitsubishi materials owned that island before. This is Osarizawa Copper Mine and Sado Gold mine are run by our company. After the mines were closed, we are doing sightseeing tours of this location.

Let me introduce briefly Osarizawa Copper Mine. Osarizawa Copper Mine is in the northern part of Akita prefecture in northern Japan near Towada Lake. In 708, the mine was discovered, and it is one of the leading copper mines of Japan. As you can see in this photograph, it is large in scale and you can see that the remains are still intact but in 1978, the copper mine was closed.

#3

Now, let me talk about the Sado Gold Mine. Sado Gold Mine, I do not know if you are familiar with this, but there was the Noh Zeami Theater, and he wrote this book, and he described the island as Island of Gold and from the olden days, it was known as an Island of Gold. There were in the past more than 50 mines in operation in the island and of those, there are three major mines and the Tsurushi Silver Mine and the Nishimikawa Alluvial Gold Deposits and Aikawa Gold and Silver Mine, commonly called Sado Gold Mine. There are others as well, but these are the three major ones. Sado gold mine including this is a heritage and we have, well, it is on the tentative list of world heritage and the Sado complex of heritage mines, primarily gold mines, and we are aiming to have inscription on the World Heritage List soon.

#4

Now, I would like to begin with the history of the mine. The first discovery of gold vein was back in 1601, and it was first discovered in 1601 and immediately after, it came to be owned by the Shogunate, Tokugawa Shogunate in 1603, and then later Meiji Government the year after the government was inaugurated in 1869 came to own the mine, and later it was transferred to the Imperial Household Agency as the treasure of the Imperial Family in 1889. In 1896, it was sold to Mitsubishi Company. It was in operation but due to the depletion of resources, iron ores, copper, the operation was closed in 1989. It has a 388-year history, and during this time of 388 years, the total output of gold was 78 tons and silver, 2330 tons. It was back then the largest gold and silver mine.

This is the mine, so we have to dig tunnels and the total length of the mining tunnel extended as much as 400 kilometers equal to the distance from Sado Island to Tokyo, and it was as deep as 800 meters in some places. There was a picture drawn in 1695 in the Edo period and already you see that the tunnels look like an ant's nest. It is like a web.

Before I proceed, in 1950, there is this news that was shown. It was still the time when the mines were booming, and I think that this will give you an idea of what a gold mine is like. So it is a 5 minute video that I would like to show to you. It is a news program.

#5

<Video (00:08:26～00:14:05)>

At the end, you saw the festival. As a matter of fact, next week, we are planning to hold the mine festival this year, and we are supposed to dance too.

#6

Now, allow me to return to explain about Sado Gold Mine. The Sado Gold Mine has three values. As I said, it has been operating for 400 years, and it has historical value. Well, at that time, the mine introduced state-of-the-art technologies. For the first time, the Iwami silver mine technology was used but then afterwards, they introduced new technologies from other parts of Japan and then started to introduce western technology. The gold mine has taken its own path. It also has a value as remains as you saw in the video. It is a large site, but there are different steps and they remain intact, and there is the value as the document. It was operated by the Shogunate and Meiji government held by the Imperial household and transferred to Mitsubishi Company. There are number of records that are still kept.

This is the drainage that was built during the Edo period. It is still remaining. This is the beginning of the Showa period, and there are no longer these facilities, but the machines, the state-of-the-art machines back then when the mines were in operation.

#7

Let me go to the Edo period, the 18th century, and there is the Iwami silver technology introduced to the gold mine. Sado Gold Mine established its own method of producing gold and silver, but it was the Edo period and things were done manually. This is the Tete-No-Warito, an open pit of vein outcrop, and this is a picture which shows how the digging took place. During the Edo period around the 18th century, we can see that this shows the gold output, but in the beginning of the Edo period there was quite a large output, but gradually we started to see the output decline. At the end of the Edo period, we think that it was literally non-existent and the Meiji period that was the mid-19th century and after we started to see a depletion of the resources. The modernization had to take place to continue to produce and therefore the technology came to its limits eventually though at first it did prosper.

#8

After the Meiji period in 1869, it came to be owned by the government, Meiji Government and modernization did take place rapidly. This is the Sado Gold Mine when it was owned by the Meiji government in the mid-19th century, and this became an Imperial household property. This shows what it was like at that time when it was owned by the Imperial household.

#9

Let me explain about the remains of the mining system. This is Aikawa. This is a town where the goldmine exists, and this is the crack that earlier I explained and the veins are here, and they were dug. This is the dressing plant location and in the Showa period, they started to establish this large scale smelting facility and this is a port from where the shipment took place. This was the overall flow and these are still intact as remains.

#10

This is Odate region and this is the first place where modernization took place. This was the main place for excavation, mining.

#11

This is the photograph and it is only parts of the facility that remain and the Headframe. This was completed in 1877, and this is an elevator, it goes down underground. It is like an elevator and it can go down to 352 meters in the same height more or less of the Tokyo Tower. This is still existing and this is hoist, the rope which lifts the elevator. This is the tunnel, and they have to compress the air, so there is this air compressor that still exists in the rock-digged room.

#12

This is the crack. This is Oshima Takatou, and he came to Sado at the age of 60 as the person in charge of mining industry, but this is after the Meiji period. We saw that rapid development took place.

#13

They dug here and they cracked here, crushed and there was a belt conveyor to carry, and they used the carts to carry the ores. This floor, you can still see the remains. They were also doing the centering, but we do not have the facilities anymore.

#14

This is the tunnel where the excavation took place right under the cracked area. This is the crushing area, the plant where they crush, and this is the belt conveyor and the warehouse where they store the ore, and these remains exist. This is inside the tunnel. These are all national treasures, cultural treasures.

#15

Ainoyama Complex. During the Meiji Period, they had such facilities. They crushed the ore and do the first centering, but we just have some remains, the foundation of the building remaining.

#16

This is Kitazawa Complex. Here there was the dressing. They sorted out the ore and did the dressing, smelting.

#17

This is Kitazawa Floatation and Dressing Plant. They sorted out the ore and the plant was located here. It looked like this. The foundation of the building still remains.

#18

This is the port, Oma Port and they had such facilities in the past. We do have some remains. There used to be a crane here for shipping and unloading, but we just have these remains.

#19

We have various documents. More than 4000 drawings and records as well as photographs, and this helps us understand the technology, the facilities, that existed in those days. We can understand the history. This is the hoist, well, they were using horse power to hoist the elevators and this is the furnace for centering the silver.

#20

This is wonderful. This painting was drawn in 1696 and this is the top-down view. You can see the tunnels and the red lines. Here, it is about 400 meters long and you lack air. You have two holes so that you can pass air through. They took 14 years to dig these holes, and from last year, tourists are visiting this location. It is a very popular spot.

This is for drainage, 922 meters long. Once, you dig down, there was lot of underground water. They need to drain out the water. This is the tunnel that they used to drain water, not excavate gold but drain water. This is drainage tunnel and therefore it is untouched and remains intact. We are still using it as a drainage tunnel.

As it is 922 meters long, it is divided into three sections. They have dug it from both directions in three sections. So six processes were undergoing at same time, but the joint points were just only 50 to 60 centimeters off and therefore it was very easy to continue to drill and connect the different sections.

#21

This is 1932. You can see that most of the things still appear in this picture. It is very impressive to see this.

#22

Having said that, this was an introduction of the Sado Gold Mine. I am responsible for managing this site as Golden Sado Company but the mine has more than 400-year history and our challenge is how to conserve and preserve and hand down this heritage to future generations. We are aiming to have the site inscribed on the World Heritage List, and we want to work to make it an even more wonderful site so that it is worthy of becoming a World Heritage Site. We would like to invite as many visitors as possible to come and enjoy our gold mine. Thank you.

(Piotrowska) Thank you very much. Do you have any questions or remarks to the presentation? Yes, please.

(Daikuzono) Thank you very much for the presentation. I am from Kagoshima. My name is Daikuzono from Osaka. About the Sado Gold Mine, the discovery of the mine, well, you have already described the history, but in 1603, you said that it came to be owned by the Shogunate but after the Sekigahara war, 3 years after they already had this system, where it was came to be owned by the government and the fact that you have such records is something very impressive but who discovered

this? I forgot the name.

(Miyahara) In Sado, I said that there were different mines. There is a Tsurushi Silver Mine close to Aikawa, and it is only a few kilometers away and that first started operation, it was a large silver mine. There were others who searched for other possible. I forgot the names, but there were three people who actually discovered the current Sado Gold Mine, and we have a record of the names. It is not a quick discovery but from the Muromachi period, they were digging gold, and they were looking for gold, and the discovery was made by these three people whose name I forgot.

(Piotrowska) Thank you very much. We have another question.

(Q2) I have never been to Sado, so I would like to ask you about what you presented. You have that steel headframe in 1877, but what was the background? How did you procure the steel frames, that is one thing that I am curious to know about and also about the fuel for the centering, where did you secure the fuel from and what type of fuel did you use and where was it sourced from?

(Miyahara) About the fuel, it was coal. There is coal at the Oma port from which they were importing or bringing in coal on ship. So it is coal that was used as a fuel from Yamagata, I think. Three was a coal mine and the coal was sourced from Yamagata and was carried by ship to Oma port. Now, the steel headframe are the headframe. I am sorry, I do not know where the steel frames came from.

(Piotrowska) Okay. Thank you very much. Have you answered to that? Yeah, okay. Thank you very much for your presentation and the introduction to the very interesting site.

May I ask the next speaker Mr. Satoshi Onozaki, Honorary Advisor to Nittetsu Mining Corporation. I would like to apologize for my pronunciation. I do my best but it is not very easy. The presentation will be on the copper industry in Japan. Sir, the floor is yours.

The copper Mines of Japan: The Industrial Heritage of Japanese Copper Mining with Special Reference to Ashio and Besshi

Satoshi Onozaki (Honorary Advisor, Nittetsu Mining Co., Ltd., Japan)

Thank you, madam chair for your introduction. I am Satoshi Onozaki. Thank you for the introduction. Amongst all relevant world heritage, industrial heritage sites that I worked for many years for the Kamaishi Mine which has Hashino mine. I again like to thank you very much for your contribution to make Kamaishi the candidate for the inscription.

I was given the topic to talk about the copper mines of Japan focusing of Ashio, Besshi and other copper mines. The member of the council recommended me to talk about the copper mining and the history in Japan. I feel so honored to take the floor.

To explain why I am asked to talk about it, let me first introduce myself which might be relevant. Actually 1934, I was born. I am 80-years-old. In 1957, the Hashino, the furnace celebrated 100

years ceremony, and I joined the company in that year. I remember attending that centennial ceremony and of course, I became a President of the Kamaishi Company and in 2007 when they celebrated the 150th anniversary celebration, I also joined that. I am also like a fossil fuel because I represent the history of this mining industry, but I love the mines and that is my backdrop because of my family background. The biggest copper mine in Japan was Ashio Copper Mine and my family came from there. I was born in Ashio, and then I joined the company, the Nittetsu. Then, so I served for the steel industry throughout my career. But you know, the Kamaishi, the mine had 150 years of history but 147 years of history of mining, both the iron and also the copper production stopped.

But Kamageshi was also famous as the copper mine in 1950 and afterwards it has – it was the biggest copper mine in Japan as well. The metal production was 280,000 tons. It is one of the 10 top copper mines in Japan. That was also the background of Kamaishi mine. Based upon that too, I can comment on the copper mine and mining in Japan and in this history. What about the history of the Japanese copper mine? You might be quite aware but some of you have not heard much about the copper mining history in Japan. So, let me take this opportunity to explain the background.

##

This shows the map of the mines in Japan from 16th to 19th century and major mines and where they are distributed in Japan. As you can see clearly from Hokkaido to Kyushu across the country, the islands, almost 200 mines were there in Japan during the Edo period under the Shogunate. Japanese mining industry was supported by all these numerous mines and then the council this time has actually talked about steel industry and the coal, but they are part of the history of the Japanese mining development. The mining industry in Japan has a long history. Of course, in the 12th century, Marco Polo wrote in his book and called Japan the gold country, golden country. So name of Japan was advertised by him. But anyway, Japan produced other things than gold. Japan was a major copper producer then. I would like to give you the historical background on the copper production as well.

##

In 1776, Adam Smith wrote in his book "An Inquiry into the Nature and Causes of the Wealth of Nations" the details about the Japanese copper production. Then let me quote some of the words from his book. For example, the European copper was dominated by the Japanese copper in terms of quality and price and then when separated from the ore, the copper had a high value. It was transported from Japan to Europe and the Japanese produced copper was sufficiently marketable. So that is written by Adam Smith, 'The Wealth of Nations'. Let me give you the background for that too.

In 1600 to 1800, this shows the Japanese copper production level and then export and production volume as well. This is Japan, its export and this shows the Japanese production. Japanese market was almost dominated or controlled by the Japanese copper. In the UK, the production in Cornwall was not really advanced and Chinese production was still lagging behind. The Swedish copper supply stopped. After that, Japan's the copper was exported for the global consumption. That was the

backdrop.

Adam Smith wrote the book on that at that time and he said that European copper market was really controlled by the Japanese copper. Production technology of copper then of course was based upon old style technology of manufacturing so that it was just mostly using the old core system and then it is open pit system of mining so that they did not fully utilize the technology. Then so the mining technology was still immature and so 1750 quite a bit of the mines I think had to be closed down because of the poor technology to develop.

In 1860s because major restoration and new government was born and so Japanese copper mine production stopped or reduced the production and many of the mines were abandoned. It was linked to the sulfide ore but anyway Japan used to be number one producer of copper at one time in history. However, that time was over and during the Meiji period, many of the mines were closed down, abandoned, so that was the situation.

Now, I would like to give you the story on Ashio Copper Mine. People talked about the Sekigahara War in 1610. This was discovered new, and they started the process after that. In 1630s, Edo Bakufu, the shogunate built Rinnoji Temple and Nikko Tosho-gu Shrine, and then they reinforced the Edo Castle. They needed copper material, majority came from Ashio Copper Mine to supply metal. It was a directly controlled territory of the Edo, the shogunate.

Then, of course, many, the Tohoku, the feudal lords developed the Ani, Osarizawa and other copper mines and they focused on development of the copper mines. Edo shogunate said they will close Japan from international trade but the shogun controlled trade going through this East India Company and then through that they exported the copper to get the currency, cash. The Edo shogunate achieved the stable dominance or peaceful era in Japan by making money, by earning currency, by selling copper, exporting it.

Technology is based upon ancient technology or traditional technology was used. In 1871, Heinrich Schliemann who discovered the Troy, the archaic ruins, he came to know about Japan. He got the idea of the Troy ruins by reading the Homer. Then, 6 years before that in 1865, he came to Japan before he discovered Troy. He made a plan to – he had witnessed how the copper was produced in Japan. He said Japanese copper mines actually achieve the highest technological level without using steam engines. That was a quote from Mr. Heinrich Schliemann, the famous archaeologist. In Sado, the gold was produced. In Iwami, silver was produced and in Japanese different mines, copper was produced and the technology at that time was highly evaluated by Mr. Schliemann as well, as high technology without using steam engines.

##

Now, let me turn to Ashio. In 1610, it opened its mining operation until Meiji and total cumulative production volume is shown in the schema as shown by red curve, Ashio production. Besshi is here. In 1680s, the Besshi mine was opened. Started production and then Sumitomo conglomerate or the family developed it and Besshi surpassed Ashio, and during the Edo period, those two mines were dominant and Osarizawa and Ani were other mines in Tohoku region, Northern Japan. In Toro during Edo period, Ashio produced 150,000 or 160,000 and then total like five-fold and then they exported this much copper to overseas.

##

After that, after Meiji period, Meiji government wanted to innovate the Japanese mining technology further. So, at the end of Edo period as has been explained earlier that to produce Canon or casting canon, the Bakufu Shogun made a great effort. But instead the Meiji government invited the foreign engineers and teachers to learn more about the mining technology to re-develop the one-time closed or suspended copper mines. After with the steam engine and motor powers and technology, and transportation means were introduced and also then other, the rock destroying technology and then pumping technology and so on were introduced from western countries and as shown here Ashio and Besshi, both started to resume or push up the production volume since Meiji and in total production is 820,000 tons and Besshi 700,000 tons. Ashio and Besshi became number one and two copper mines in Japan in terms of production volume. But because of this activity, the technology was also transferred, introduced. Industrial heritages are now there, and I think it is quite necessary to consider that heritage and that is why we are now involved in these activities.

But Japanese copper mine companies and some companies are quite negative and against this designation for the world heritage because during the Meiji, of course, they had to dig deeper and then so that they had production of the sulfide ore and sulfide ores were used to produce copper and then process in smelt and refine but discard or the waste products caused the pollution problem in conjunction with the copper mining development and pollution became an issue and gas was another issue or water pollution problem and also the waste problem. Numerous pollution problems were there. This problem lingered on till the end of the World War II and even post-war period has become a serious social issue. So that is the background and that is why the copper mine companies are negative about this inscription.

Sado, the mine is now tentatively inscribed. But Ashio of course, the Nikko City has nominated itself to be a candidate and so they are making efforts to be listed. But it is still in the tentative, it is not yet included in the tentative list, and I wanted to talk about Besshi of the Sumitomo conglomerate, former conglomerate. But Sumitomo is still not positive at all about this candidacy for inscription Ashio, Osarizawa and others. They are not at all positive about it. How can we unite the voices of some of the mine entities who are not supporting this course yet? So that is our challenge now amongst the mining companies.

During the Greek era, the Socrates said, without agriculture there is no technology. That I think is the world, but now, industrial heritage, during the industrial revolution, the westerners said, without manufacturing industry, there is no industry per se. Japan developed the mining industry in mines including coal mines. Transportation technology also was developed and the waste water and drainage system and other new technologies needed to be also developed and applied. And that kind of technological development really contributed to the entire improvement and development of Japanese industrial technology.

Unfortunately, the copper mines in Japan in around 1970s suffered from difficulties like exchange rate problems and depleting ore and then globalization issue where some people started to import the material, so many of the copper mines were forced to close down. As shown in the map, as I said, there are so many mines in Japan. During the Taisho and Showa, 3000 mines existed in Japan but

now it shrunk to just a couple, Kushikino, the gold mine of Sumitomo and then one coal mine in Hokkaido. There are only a couple. What happens to the copper supply for Japan now? They are now trying to have a voluntary development of the mine or the joint development of new mines. In other words, the overseas mines are developed together with the Japanese technology and the copper is imported to Japan, 1.5 million tons of copper is sort of supplied to Japan. Then, so refineries are now built around the coastal areas of Japan, so the refining business is mainstream in Japan.

But there is a pollution control technology which was developed in Japan. I do not have time to talk about pollution prevention technology we developed in Japan and Japan successfully solved the problem of environment. Some introduced technology was congested and actually digested and then improved. Mitsubishi method and many other good technologies were developed in Japan.

Pollution control and prevention technology was developed. In the copper smelting and refining, there is no pollution anymore or hardly any pollution. Taking into account the environment problems and in conjunction with the industrial heritage, we would like to really advocate a cause by saying that we can also collaborate with other countries in terms of helping them to eliminate the pollution problem or prevent pollution problem. Ashio has a good example.

But we have the material of Besshi which is distributed to you in your handout. I think you can look at this Besshi material. Thank you for your attention.

(Piotrowska) Thank you very much for your presentation. Are there any questions to our speaker?

(Q3) I come from Kobe. My name is Fujimoto. You talked about Besshi Copper Mine, Mr. Onozaki. In this brochure that has been distributed to you, so I have a couple of points. Because I worked one time at Besshi, may I add?

(Piotrowska) He is a specialist with Besshi mine.

(Q3) When you look at this map for the foreign people, it is only written in Japanese. In the map, there are several circles and then the bottom one shows this dark yellow one. The former Besshi area during the Edo period, the mining took place in the part of the Besshi and you can see the ruins there and up there you see the Tounaru area, brown circle. During Meiji era, the mining headquarters were located and then up there, the blue circle shows Tatsukawa Hadeba area of Besshi. During Showa era, that mining headquarters placed around here. On top you see the red circled area shows the Hirose Saihei, a person who was the president or general manager during the Meiji era. They had a residential area in that. Then, on upper part of this map, near the coast, the red circle shows the new facility in Showa and afterwards, residential and other historical areas, and Sumitomo chemical plant is still located there as well.

Besshi copper mine as the industrial heritage, this photo shows the interesting places, some noteworthy photos are shown. At the bottom, you see Shisaka Island is interesting place and the next one, the Gunkanjima Island story is being talked about, but this island is about 20 kilometers off Niihama. That is where refining smelting took place and so the island was acquired by the company. Five thousand people one time lived on that island and worked but smelting finished. The other

people continued to work for other work, but nobody is yet allowed to go in there.

(Piotrowska) Thank you very much for this additional explanations, presentation. The time for question is passed. Thank you once again for the presentation.

May I ask the next speaker Dr. Lin, Assistant Professor from Chung Yuan Christian University from Taiwan with presentation on 'The Gold Ecological Park in Northern Taiwan'?

From Mining Site to Heritage Site – Jinguashi Gold Ecological Park, Taiwan

Dr. Hsiao-Wei Lin (Assistant Professor, Chung Yuan Christian University, Taiwan)

Hello, good afternoon, ladies and gentlemen. First of all, I would like to thank you very much for this invitation to join this National Congress. I think I am learning a lot not only from our Japanese colleague onsite during our past 4 days trip about evolution routes, but also I am learning a lot from among those foreign expertise from TICCIH. During the conversation, I feel it is really prosperous trip for me and also very good learning opportunity. Thank you very much for the organizer's invitation.

Second thing, I think we already sit here quite a long time. If you are still awake, can you raise your right hand for me? Okay. You can give a huddle for your neighbors trying to wake up. That is the trick I did to my student. But yeah, just to wake everyone up.

My name is Hsiao-Wei Lin. I teach in Chung Yuan Christian University. I am board member of TICCIH and also the Chairman of Organizing Committee for the TICCIH Congress 2012. Today, I would like to talk about the Jinguashi Gold Ecological Park and thank you for two of our previous Japanese colleagues. They already laid a very good foundation for gold mining and copper mining. In fact, Jinguashi Gold Ecological Park it was gold mine and copper mine in the past.

#1

For most of you I think, many people have been to Taiwan, but if you have not, here is a brief information about Taiwan's size and population and the lands and otherwise. In general, two-third of Taiwan's land is mountain. So that is why our west coasts are heavily populated with a lot of population and Jinguashi is in this area of Northern Taiwan is not too far from Taipei, so all of you are welcome to have a visit.

#2

This is today's presentation outline. The first I will give a very quick introduction about development of conservation of industrial heritage in Taiwan. Then, I will come to Jinguashi and its transformation from island to heritage land. Today, I am not going to give you too much historical information and those technical backgrounds because I am not from that background. What I will more focus on will be the management and also this adopt reuse plan and what is the challenge of it and what is the future.

#3

This is the elevation of Taiwan. You can see our topography is dramatic from the sea level up to nearly 4000 meters. Therefore based on this kind of geographic character and the plantation, our industry start with those forest, camphor, tea, tobacco, sugar factory, distillery. Coming to the second stage of mining, the major mining of Taiwan mainly on the northern mountain area will be the coal, gold, and copper. Then, this is recently stage about the computer, manufacturing and also high-tech things.

#4

The historical development of industry in Taiwan started at the Qing Dynasty which is from 1891 by Governor Liu. He introduced the first railway, electricity and telecom system in Taiwan but the big scale of modernization, industrialization, development actually came after 1895 thanks to the Japanese occupation era. Japanese government introduced the monopoly of sugar, winery, salt and so on with regulation and mining regulation as well.

Land lease period is after 1945, The Republic of China, so we start with our industry development and for the conservation of industrial heritage is coming more recently. The big scale survey plan is actually coming from 2002 because at that time we have a big scale of state-owned industrial restructuring. Many of the state-owned industry became privatized. Due to the privatization, so there are many land facility need to be declared.

After this big scale of survey, then they are coming with lot of land with lease. That is why if now you go to Taipei or any part of Taiwan, you will see quite a lot of reuse plan of winery and sugar factory and so on. Since 2006 until now serious reuse plan and conservation project are continued.

#5

This is roughly those major Taiwan's industrial heritage site. Yeah, and for the TICCIH 2012 in Taiwan, we organize the post-Congress tour, so I had some leaflet, later you can have a look. We organize some journey around the Taiwan's industrial heritage. Among those industrial heritage sites, we have one title, this is made by the Ministry of Culture, we call the Potential World Heritage Sites. Yeah, of course, I think all of you know Taiwan so far cannot be a world heritage site. But I think we want to reach this kind of standard in order to communicate with the world.

We have 18 world heritage potential sites now. Among them these six, they are more relevant to the industrial heritage, especially this Shuei-Jin-Jiou Mining Site. Actually, this one is my major topic today. Shuei-Jin-Jiou this is short name of three settlement. Shuei is Shuinandong. Jin is Jinguashi, Jiou is Jioufen. This is basically this gold and copper mining and Jioufen is coal mining. This whole area later you will see the map, they are connected nearby each other.

This is one of the sites and the second one is Alishan Forest Railway. This is one of I think top four high mountain railways among the world.

The another one is Wushantou Water Reservoir and Jianan Irrigation Waterways and Old Mountain and so on. Those are the major industrial related one and in fact I think four of them are related to the Japanese period development.

#6

However, let us come to today's major topic, Jinguashi and its transformation. As you can see from this map, this is free settlement; we talk about Shuei-Jin-Jiou. Shuei is Shuinandong. Here is the refinery for the gold and copper and Jinguashi is a mining site. They are actually doing a mining here, then send to this refinery, then coming here – in the past, here it has a harbor. Then, they were shipped gold to Japan. This is the Jioufen area. From the coal, gold, and copper, they are all gathering in this area. That is also why the mountain has quite a dramatic shape.

#7

For example, the gold mining start at 1889. Let us say in Ching Government, how do they find the gold mine? Actually, as early as in 16th century, the Spanish and the Dutch they already tried to find some gold from Taiwan but unfortunately they were not successful. Until Ching dynasty, as we mentioned, government really try to build the railway from Keelung to Taipei and those workers actually they find the gold scent along the Keelung River. Then, this is how Jinguashi start to develop. This is the big gold rock mountain at that time. Those things are the exhibition object which you can see in the gold museum right now. They are showing how in the past people are doing the gold mining. Here, 3 years later, they find this is good business, so they start to set up Gold Bureau and start charging the tax.

#8

The major modern machinery for the mining actually comes, as I mentioned earlier, started 1896. The Taiwan Mining Industrial Regulation introduced by Japanese government and the Japanese company, at that time, they are two major companies. They occupy the Jinguashi on the east side and Jioufen on the west side. This is Tanaka Corporation and Fujida Corporation. The major character at that time is that they introduced the modern machinery and until 1905 the gold production already reduced, but they started with the copper production and they use this cyanide refinery technology and at that time they claimed that as number one metal mountains in Asia.

Until 1920s Taiyang Mining Company set up and this is set up by a Taiwanese person. Yeah. This is company actually still the biggest land owner among this area and between 1933 to 1945 many of the products here like copper and gold are all shipped to Saganoseki, somewhere in Japan. This mine is completely closed in 1987. This is during the peak of production time, you can see the big scale of refinery. They are called the 13 levels refinery because that is built on the mountain terrace for 13 levels. This is for the production cable car.

#9

We can get some figures here and this is the technology improvement and basically stuff with the hand rocking method to the cyanide refining method. Why I mentioned this is basically right now the museums are provided with this kind of tour. You can also use this method, the hand work method to do something when you can get your own gold.

#10

For the figures you can see from here, it is quite dramatic for the production amount. In 1933,

there is 10,000 tons of ore was processed in Shuinandong area and in 1936, it is more than doubled. This is the quote from the newspaper at that time, yeah. If all the gold output exceeds 3 tons, then they will be the number one in East Asia. This is talk about landscape at that time. They are 13,200 feet multiple lines overhead cable system. You can imagine the busy transportation and landscape at that time.

#11

Third is the scale in terms of production. There are also interesting things about the social condition. Because at that time, there are 700 workers from Japan, they start to teach some Taiwanese workers to do the work and 6,000 Taiwanese and also have people from China. This is quite together with their family, it is quite a big population about 15,400 people. Therefore, Jinguashi used also, we call it like in – in its glory time, it is golden city because the miners are rich. They have a lot of money to use and also Jinguashi because this is Japanese company start, so they introduce the school and community shop and hospital. So people lived in Jinguashi area actually have relative well lifestyle, so you can see that.

#12

Another important figure in Jinguashi area is the allied prisoners of war actually captured in South East Asia is forced to work in the Jinguashi mine. The gold mine will be around 18 degree but copper mine, it is very high temperature around 40 degree. Many of them actually unfortunately cannot return to their home country. Right now, around this gold ecological park, there is a memorial for this prisoner of war. Every year actually they have small ceremony for them from overseas.

#13

As we were talking about there is a lot of workers from Japan, Taiwan and China, and they introduce separate living area to separate the Japanese and the others. This is the guide map for the Gold ecological park. This will be the bus terminal and station area and once you come into here, then here is the Gold Temple and Benshan tunnel and as you go along here, you can come to number three is environmental education center. Most of them are the reuse of the office building and this area is, what they call, the refinery building. There is also narrow lane of Crown Prince Chalet, later I will show you more detailed map. However, this is the community area and this is how the former Taiwanese people live and on a higher level on the mountain is the Japanese officer's house. Right now, these four joint Japanese style residences are beautifully restored.

#14

This is the tourist map what they offer as used the concept of ecological park. From the station, you are close to the Jioufen area. Then, this is the Jinguashi Gold Ecological Park. The main figures where we have the shrine and the gold museum and one open tunnel which is about 180 meters, you can go and experience how the minor has been worked. Then, you can go to see the Prince Crown Chalet, and you are coming to the community site, you can see the temples and the war memorial, and you need to drive down close to the mountain reach, then you can come to the gold

refinery – sorry, 13th level is the final area and also the waterfall.

#15

This is to the show the Taiwanese living area. Right now there is one big temple, of course, it is built afterward. But here you can see it is built according to the topography and many of this kind of black roof built by the thatch because cheap and prevent the rain. These are the Japanese worker's house.

#16

All of this current reuse plan actually starts since 2002, and they start to do the restoration work and this is a Museum of Gold. Actually, this is new structure, but inside it is the old office building. Then, also, they start to do the restoration of chalet, tunnel, accommodation and open space. It is also nominated as Taiwan's Potential World Heritage Site since 2009, and this is what we explained before, 3 mining settlement.

But I think that time they imposed this idea as eco-museum concept. This is actually quite advanced in Taiwan that time because before it is museum, it is one building or two buildings but in this project, they started to consider about the whole area including mountain area because without those mountains and mines you cannot have this gold mine.

#17

This is the museum itself. It is previous to Taiwan Metro Mining Company.

#18

Inside, you have some archaeology remains and also you have 220 kg gold. They say if you can lift it with one hand, you can bring it home. They also operate some tour to do the gold as a farmer.

#19

This is the Environmental Education Building. This is also reuse of one of the office building. They have clear explanation about the geological model of Jinguashi and some *quarry (01:15:55)* and other things.

#20

This is the open tunnel which you can experience the miners' life.

#21

Inside, they have installation and storytelling and the song stimulator and the wax figures to show how they worked in the past.

#22

This is Crown Prince Chalet, but unfortunately the Emperor never came. They just built for him. But from this building, you can see how the western lifestyle has been influencing Japanese people's

taste. He has those archery range and mini, like golf range in the back garden, also the study room. It is a mix of Japanese and western style.

#23

At this area, if you go up a little bit, you can also see this is gold temple to worship the god and also for the miner to have this kind of comfort for their dangerous mining life. This is one of the most beautiful police stations in Taiwan. It is concrete building but after they start with the gold ecological park project, they started doing a lot renovation and cover for the buildings inside the area. This is how it looks like.

#24

Above is a brief introduction about the area and what have on the site. But, unfortunately, actually this site going to start from mining site to heritage site, there is still a lot of work to do. First thing is the surrounding remains, as we were talking or listening from the previous lecture yesterday and today, we talked about the integrity. The surrounding remains, this is Thirteen Level Refinery. Actually, it is not included in Gold Ecological Park. Of course, you can look it from outside, but it is not included on the tour guide and the many explanations.

#25

It is left over and why is it like that? In fact, because the ownership is very complicated. As we have mentioned the park itself now is partly new Taipei City governments' land, but the rest are like this land is belonging to Taiwan Metal Company and the other one is Taiwan Sugar Company because they do not have any production values. Nobody wants to do anything about that. This is a little bit like question marks just left there, so nobody is doing anything except some students or people are adventurous will climb over the range, fence then getting to make some photos. But the scale of this actually is very big. It is quite worth to include that in terms of have a whole complete story.

#26

The second thing is the gigantic waste gas pipes of the copper refinery. Because this was a small value before, in order to get rid of this toxic air, so they build this very long gas pipe to go to the other side of the Keelung in order to get rid of the poison gas. This one also is difficult to clean because that is with a lot of toxic deposit inside that. It is okay just to leave there if nobody touch it, but the cost to clean it actually Taiwan Electricity Company has been spent some money to try to clean them before but in the end, I think they only do one kilometer or something cost them fortune, so it is stopped. Like those are the problems still need to sort.

#27

The third problem is the geological characters. Because the heavy metal and deposit from the mine, so the surrounding area, some part of this landscapes are very unique, and this needs a more clear protection because otherwise people just come and maybe destroy it.

#28

In conclusion, I think Gold Ecological Park is quite a valuable site in terms of Taiwan's development history and right now it is very popular tourist destination, as we have mentioned, this combined together with Jioufen coal mining site which is popular for the Japanese animation story. But because this development, many of the development and focus is tourism development rather than the heritage protection, so as had been mentioned earlier, in order to gather the whole story, the whole landscape and also this refinery remained actually should have a proper interpretation including inside the Gold Ecological Park's guide including. the nature and the man-made factor and also the ownership. This is also what very envied here. During our journey. I think we see a great cooperation on the public and private partnership and so far this is one of the biggest problems in that area.

So, the museum is museum. The museum inside is very nice but on the other hand on the settlement area not too much work has been done. But actually that is very important viewpoint to see the gold refinery because when we were doing all the basic excursions, we are not only having guide from museum. Once we had guide from 70-years-old miner. Through his story then I started to realize how to see the mountain, which part has the mine underneath the concrete or somewhere with less grass, what that means. This is automatic arranged by a local community but does not catch too much attention. It is more minor effort. But I think that part should be emphasized to enhance this local people's point of view to get a complete story about the Gold Ecological Park. That is my presentation. Thank you for your attention.

(Piotrowska) Thank you very much. Are there any questions? I see none. May I ask the next speaker Professor Massimo Preite. He will take us to Italy for 20 minutes.

The Italian Experience of the Mining Parks as Example of Landscape Recovery

Prof. Massimo Preite (Department of Architecture, University of Florence, Italy)

I apologize if I stay here. But as I have my notes, the table is more comfortable. My name is Massimo Preite. I am teacher at the University of Florence, I am architect. I am a Board Member of TICCIH, Board Member of the European Route of Industrial Heritage and the Vice-President of Italian Association for Industrial Heritage.

First of all, I want to express all my gratitude for the invitation to attend this Congress. I particularly appreciated the availability of the organizers to accept the subject that is not directly related to the main topic of this Congress. My presentation concerns the institution of some mining parks in Italy that are not UNESCO sites and are not an expression of some technological interchange between Japan and Italy. Anyway, I believe that Italian experience can provide useful elements of confrontation and give some suggestions on the way industrial past can continue to have an active role in our society.

The first question. Why the Italian mining parks? Because their institution has represented a new approach as regards to three factors; the enhancement of the industrial heritage, the community participation to the heritage protection, and the recovery of the mining landscape. This last topic is

the argument of my presentation.

#2

Among the mining parks created in Italy in the last 20 year, the following stand out. San Silvestro, Amiata, and the Metalliferous Hills in Tuscany, Geomining Park of Sardinia in Sardinia, Floristella Park in Sicily and Sulfur Mines Park in Le Marche region.

#3

The first problem to be solved was institutional because Italian law lacks an official definition of Mining Park. Usually, Italian mining parks are assimilated to the nature parks, but the difference between them are very sharp. Nature park is monothematic, is only nature environment. The mining park is a cluster of different heritage elements, industrial heritage, archaeology and so on. The nature park is a continuous surface. The mining park has a discontinuous structure since it is composed by a multiplicity of sites scattered over a wide territory. The following examples make evident the futures of network of the Italian mining parks.

#4

Here the archaeo-mining park of San Silvestro organized on six thematic routes linking mining testimonies of different age from the Etruscan age to the contemporary year.

#5

The next, the Geomining Park of Sardinia is the biggest among the Italian mining parks. It is a collection of 8 distinct mining areas located in different zone or the region.

#6

The Technological and Archaeological Park of Metalliferous Hills is composed by 84 sites spread on 7 municipalities.

#7

Finally, the Amiata Museum Park of mining composed by 14 mining sites spread on the territory of 11 municipalities.

#8

What are the consequences in terms of perception of this polycentric landscape? Traditionally, landscape view implies three elements. Something to be viewed, an observer and the point from where the landscape can be embraced by the eye in a single image. The mining landscape is irreversible to this model for two reasons. First, if the mining landscape is a network, a single point of view is not sufficient. Second, the mining landscape observation is not able to catch all the meanings. Mining landscape can be fully understood only if you are able to read it as a text.

The pass from the mining landscape to be seen to the mining landscape to be read is a turning point in our Italian culture. I propose a comparative illustration of a sample of Italian mining

landscape according to three different readings key; technology, archaeology and environment.

#9

How technology can shape the mining landscape? I will give you three examples of interaction. I have to cut because the presentation is a bit too long.

#10

The first example is more a mine, Ravi Marchi is the name in the Metalliferous Hills Park. The site's morphology is the key factor that explains the spatial organization of the mining activity. In the Ravi Marchi mine, the mining plant was adapted to the orography of the site in order to exploit slopes and altitude gaps and facilitate the ore transfer. The 3D view explained the process. The museographic stage of the site mirrors the itinerary of the ore from the extraction to the final processing treatment.

#11

Second example: Mining landscape as a mirror of the technological evolution.

#12

Abbadia San Salvatore mine is the top site of the Mining Park of Amiata. In redevelopment scheme, you can distinguish all the new functions.

#13-16

In this aerial view show all the sequence, all the generations of kilns and condenser for the distillation of mercury. The principle of this mine is that the new kilns did not substitute the former and so you have in addition and you conserve all the historical successions of the used equipment. You have Spirek Furnaces, the oldest. You have Gould Furnaces and finally you have Nesa Furnaces. Every new equipment is more able to deal with low concentration of mineral in the ore. The coexistence of old and new kilns engenders an encyclopedia landscape that keeps trace of every step of innovation process.

#17

The third example is the adjustment of the loading facility to the geographic location. Porto Flavia is located in sea harbor near Nebida. Its aim was to make easier the ore loading into the ships.

#18-21

It is composed by two superimposed tunnels. Each 600 meters long, linked by 9 vertical silos. In the upper tunnel, an electric train brought the ore, the ore was unloaded by gravity into the silos. In the lower tunnel, a conveyor belt receive the ore and by an extensible conveyor, it was able to load the steam ships more at the base of the cliff. This facility has begun a landmark in the Geomining Park of Sardinia.

#22

I told you I want to compare this sample of mining landscape according to different explanatory key. The second is archaeological remains.

#23

What can we learn from this example, San Silvestro Castle in the Archaeo-mining Park of San Silvestro? It is the most famous of numerous mining castles that appeared in Tuscany in 11th century. Their name mining castle was justified by the fact that right inside them dedicated spaces for specialized ore processing activities were provided.

#24

As expression of middle age civilization, mining castles like San Silvestro prove that mining production covers a much longer period than the modern industrial revolution. The historic beginning of what is named industrial heritage should be backdated in order to include mining heritage of the past centuries.

#25

Another unexpected meaning of the archaeological mining landscape, how a wrong investment has become industrial heritage. In the Etruscan Copper Estate Mines was an English company that invested in mining activities in Campiglia district in 1902. The company decided to invest in spite of the general advice that the ore was not profitable.

#26

The company collapsed after about 7 years leaving the still visible traces of the buildings and infrastructure of the mine. You can recognize the washing plant, the roasting furnaces, they are the jewels of industrial archaeology in this mining district.

#27

But we cannot forget that Etruscan Mines is the celebration of a big failure, of a big fiasco in financial terms. It is an example how a negative event becomes a positive value from the heritage point of view.

#28-29

The last consideration on archaeological mining landscape concerns the notion of integrity. Here the ruins of Lamarmora Washing Plant in Nebida. The washing plant built in 1897 is an imposing stone building, and it is the most outstanding landmark of Geopark of Sardinia. I wonder how it is possible to evaluate its integrity.

#30

According to the operational guides of UNESCO, integrity criterion is satisfied only when a property includes all elements to ensure the complete representation of its features. But this kind of

ruin does not give explanation about what it was, but I think that if you can see these ruins not as a fragment but as a positive component of a new integrity produced by the merger of artificial nature and so we must evaluate the integrity of this property as regard the integrity of the present mining landscape, not of the past mining.

#31

After technology, environment. Environment, it is very intriguing because we cannot understand the contemporary mining landscape without making reference to heritage paradox. What was a polluting waste of the past mining activity has become an historic and cultural property today for a strange metamorphose.

#32

Some examples, here you have San Giovanni Dump created by the collection of sludge coming from the floating plant of Gavorrano Mine and below the Roste, they are residuals very polluting of the processing ore for the extraction of copper.

#33

Both of them are the outcome of highly polluting mining activities. But they are considered as monuments to be preserved today.

#34

We can say the same thing for the last example, the Red Sludge Dump of Monteponi. This majestic multilayer sludge are the residual of electrolytic processing plant of Monteponi. This sludge very, very polluting has been designated as the cultural property to be preserved. The contamination occurred in the past is an object of protection today. I can ensure that is a protection very, very expensive.

#35

Now, the question, if the past environmental pollution has become heritage, how to reclaim the mining landscape? Traditional reclamation handbooks require the operator to restore the affected area as it was before the mining activity. It means that the best reclamation is erasing its remain of the past activity. This approach is antagonist and unfit with the preservation of the present mining landscape. An appropriate approach should be to harmonize reclamation and protection of the mining sites.

#36

Some examples. The first, the Rostan Pit. The example of Rostan Pit shows that the most effective method is to proceed to a tabularized clean up involving the elimination of almost all mining heritage. In this case if you compare the pictures, only the shaft survived. The ore processing facility located below the shaft was totally destroyed.

#37

The reclamation of Pozzo 4, the mining equipment in this case was saved but the capping treatment mellows the landscape and by this way falsifies its original features.

#38

Here some examples in the Amiata Mining Park, the clean-up of Morone Mine. You can see the contamination, the contaminated soil was removed and stored around the furnace building. This explains why the ground level has risen, as you can see, if you compare the picture.

#39

The last one is a good example of decontamination because the reclamation was carried out without destroying the polluted structure. The technicians who have drawn up a specific decontamination techniques for all kinds of materials; concrete, plaster, metal, bricks and thanks to their application, it was possible to preserve all the furnaces and the condensers of the mercury mine to benefit of the integrity criterion.

#40

Finally, the big question how to revitalize the mining landscape. If urban regeneration proved to be able to assign new functions to urban industrial landscape, we must say that up to now Italian mining parks have not demonstrated the same ability. The next challenge is to avoid that the mining parks survive as fossilized landscapes unable to evolve and give them new functions.

#41

As a possible response to this challenge, I will show you the experience of redevelopment of the mining landscape of Serbariu Carbonia in Sardinia. This landscape is composed by two major components. The coal mine of Serbariu and the new town of Carbonia realized by the fascist regime in order to settle the families of the minors. The town of Carbonia has been revamped by the creation of an open air museum whose purpose is to illustrate the urban heritage.

#42

Carbonia routes of modern architecture provides different itineraries that keep with information displays illustrating historical and architectural features of a new town founded by the fascist regime.

#43

The mining site of Serbariu has been reconverted for cultural activities and houses the Italian center for the coal culture.

#44

The center created in 2006 is also a museum set up in the old lamp room which houses the permanent exhibition of the history of coal and of the mine and town of Carbonia.

#45

For all these reasons, the city of Carbonia was awarded the Council of Europe's Landscape Prize in 2011. The citation explains that the prize was awarded to Carbonia for all the actions undertaken to restore, protect and convert the urban and mining components of the 20th century landscape. By this way Carbonia gave the demonstration that the ancient mining landscape can evolve and become a contemporary and active landscape without giving up its identity. Thank you very much for your attention.

(Piotrowska) Thank you, professor. I am afraid we do not have time for questions. Can we postpone them over the coffee break?

We have one more speaker. May I ask Mr. Takafumi Tsujimoto with his presentation on Mining Technologies in Japan and may I ask for the time management as much as possible? We are a little bit late with our session.

Mining Technologies in Japan: Its Development in Domestic Mines and Importance in Modern Industry in Japan

Takafumi Tsujimoto (Executive Director, JOGMEC)

Thank you very much for your kind introduction. I am from JOGMEC from Japan, Oil, Gas and Metals National Corporation. My name is Tsujimoto. We are under the jurisdiction of the METI, it is a government organization. We are in charge of the mining policy implementation of the government of Japan. The underground metal and mineral resources and oil and gas and coal and then geothermal, all resources should be supplied stably and that is our mission.

Industrial technology has become the very advanced state and then the current Japanese industry is supported by the mining industry which developed over the years. So that is the gist of my presentation. Already many previous speakers already covered Mr. Miyahara and Ozonaki, they covered about Ashio and then so on, so I would like to skip some of the overlapping parts.

#2

The Japanese history was already covered. In the past, for many years Japan has been the major, the mining country with the mining industry. This is a Pacific Ocean site. Geologically Japan has a very unique position that we have the plate movement and then we have the volcanoes and earthquakes. Because of the volcanic activities and so on, we have been endowed with the important metallic and other mineral resources and ores since the ancient time that the metal processing and refining technologies was there and the great Buddha of Nara was created over 1000 years ago and they used the bronze as well as the gold plate on the top and then mostly it is a 500-ton of copper, 0.4 tons of gold plating is already done to make this giant Buddha in Nara.

Then during the major restoration until recently in Meiji of course the Japanese industry and then mining really prospered. And then some of the representative corporations were born through mining industry; Besshi is one of the example. This is the old scroll painting of Besshi copper mine which started Sumitomo Group, which used to be Sumitomo conglomerate. So that original starting

point of Sumitomo Group was Besshi Coal Mine, copper mine rather and then major other industry groups today were initially were the mining company or the mining as the major resources or the revenue. The mining technology and the relevant advanced technology has enabled them to become the major industry or industry group in the history.

#3

In 1964, the Olympic Games were held in Tokyo. It is a little before the Olympic Games, but you can see there are so many numerous mines, over 200 mines existed, over 30,000 Japanese people were employed in the mines. Then, I was a primary school student and at that time that when we studied the Japanese sociology textbooks, we learned about the names like Osarizawa and then Ashio and all these mine names, even mentioned in Japanese textbooks for school children. The mining was so important.

However, in 2014, what happened we only have one gold mine in Kagoshima prefecture, Hishikari Mine. Because of the strong Japanese yen and then change of the industrial structure has shifted from the labor intensive to the technology intensive industry and through the historical structure change of industry, the mining no longer is so important. Almost eliminated from the Japanese industrial structure but even today we have numerous important smelters and refineries in Japan for the copper smelting and lead refining and zinc processing and so on. Of course, high technology is required for this capacity. We have the world top ranking technology in our smelters and refining facilities.

#4

Now, I would like to talk about the metal and how metal is used in our industries. One of the examples is here. The base metals, the name represents that they are used in many basic, base industries such includes the copper, zinc and lead and iron, nickel, and aluminum and so on and the copper of course is processed to make like electric lines, wires and cables and it is applied for the automotive industry and high tech industry for the zinc, as you can see. It is used for the automobile, the body making like hot-dip coated steel sheets. It is also applied for the electronics and electric industry, machine industry as well and lead is famous used in the automotive battery.

#5

Another thing we should not forget is that other rare metals or minor metals, these are rare or minor metals are called vitamins for industry. We only need a small amount but still they are crucial for and indispensable for high-tech industry, as you can see, that the cobalt and tungsten and so on and gallium.

Half of the gallium is consumed by Japan and then cobalt is used for lithium ion battery and 20% of that is used in Japan, so to support the Japanese high-tech industry, like applied for TV, digital camera and PC and then the modern automobiles. Now, automobile is this really used all kinds of rare metals and high technology. So that is how the minor metals are used.

#6

This actually shows the mining development and how the metals are produced. Initially, the exploration takes place. Through exploration, the good location is explored and found and grade is confirmed. The volume of the ore is confirmed and after economic feasibility analysis, it is decided to be developed and then mining actually takes place and after the mining, the use for the mineral is processed and so that is sorted out. Then after that it is brought to the smelter and then mineral processing and smelting is done; only necessary metal is extracted which is now sent to the other industries for further processing, like copper, on the average 0.0055% is the average grade of copper in crust, but usually in the ore there is about 1% and through the concentration zone, the grade goes up to and then level goes up to 20% to 40% concentration. The concentrates are brought to smelter and raised to 99.99% grade of copper metal.

#7

Different technology, of course, is backed by the long history of Japan. It is a nurtured technology. We now enjoy the highest level of technology globally and so in the mining industry Japanese companies are active in many parts of the world involved in the joint and investment and development projects of the different mines and exploration technology shown here.

Not just boring exploration but we have other ways of exploration technology – remote sensing where the satellites are used and Japan has the state-of-the-art technology in this area which might not be well known but Japanese government has launched the satellite sensors useful for the exploration and then physical and geological survey methods and boring methods are available to detect and find new deposits. So that Japan now enjoys and has the highest level of the state-of-the-art technology.

#8

One example, is successful case of discovery of the Hishikari gold mine. The only operating active mine in Japan. Toward the end of the Showa Era about 25 years ago, the mine was discovered in Kagoshima, Kushikino area. The modern technology is applied for the exploration and this new gold mine was discovered by the aerial exploration and other technology, gravity measurement and so on. This ore was discovered. This deposit is said to have the world highest grade of gold.

The average one is 1 gram per one tonne of the ore. In other words, 1 over one-millionth. It is like only one out of one million. I am originally from Kansai. Kobe has 1 million people and then if just one person in 1 million population is like a gold in this analogy. Hishikari had 80 gram per one ton and now it is 40 gram per one ton of excavation. It now has the world's one of the highest grade of the gold, over 200 tons were excavated. For 400 years in Sado, they actually produced 80 tons. This is the only available and active gold mine in Japan now.

#9

Then, so after they become the operating mine, actual mining activity starts. This shows the underground method. There are lots of underground mines and then there is another one, open pit method of mining. Underground and open pit mining technology is available. We do not have other metal mine in Japan, but we have the mines for the limestone and in Japan, there are quite a few open pit limestone mines where the high level of the technology is applied.

#10

The smelting refining, we now enjoy the world highest level of technology here as well. First concentration of about 33% of the copper imported to Japan and that level goes up to 65, 99% of the copper to almost pure copper is created after all. So that is a by-product also coming from there. Aside from copper, different other elements are also recovered and recycled in Japanese smelters, even the platinum and gold and many other rare metals are now recycled and recovered by Japanese technology from this smelting technology.

#11

One important factor is so called Kuroko, complicated sulfide, there used to be lots of mines in Akita prefecture. This is Kuroko ore which actually contains all kinds of minerals. The elements in one type of ore but you have to sort out and extract which was a challenging technology we needed. Japan developed a unique technology to recover many metals from this complicated ore called Kuroko or complicated sulfide. And then this technology is still fully utilized and we import all kinds of ores but that technology could be applied to different ores. Aside from the copper and then the zinc and so on, germanium and then indium and then cobalt and all these metals are included in this type of ore and Japanese smelters and refineries can extract and recover such elements.

#12

State-of-the-art technology, especially strong in recycling technology because there are lots of the used electronic and electric gadgets and then from all these old products, the rare metals can be extracted which is really contributing to the better environment and recycled society. This is Akita prefecture, Kosaka Smelting & Refining Company which is a specialized plant for recycling.

#13

Another one that we should never forget is that in Japan we had many, many mines in the past and then we also suffered from the pollution caused by the old mines. We have developed environment protection technology to cope with the pollution problem and our environment protection technology has reached world top level as well. This is Iwate prefecture, it was Matsuo, the copper mine or the mine which used to be the biggest one in the orient and 15,000 people used to work here in the mine. After the abandonment, closure of the mine, the acidic drainage, waste-water drainage actually contaminated the river water, but to solve this problem, we have implemented the measure.

#14

We have set up this treatment, waste water treatment facility so that they are neutralized and then they are now put back into the sewage water. In 2008, it used to be acidic water, now it is a clean water, discharged to the water. For the last more than 30 years or so, there was no incident or accident. Morioka City is downstream of this Kitakami River. Morioka city now is supplied with clean water through this kind of environment protection measures. This is the technology we have developed and accumulated, and we have the world top technology for the pollution control.

#15

Now, the emerging countries and other countries are trying to develop mining and then so we are very active to provide technology in our system in technical cooperation including Myanmar and Peru and Laos. These are the countries where we visit and give technical training so that their development of the future mines would prevent any pollution. This is the activity. Because we have technology of mining related technology as well as pollution control technology, Japanese companies when they are engaged in the cooperative projects to develop mines overseas, this is a good thing they do and then many recipient countries, emerging countries are welcoming Japanese investment in their mines because of this technological cooperation.

#16

This is the conclusion. I have skipped through to tell you about the history of the mining industry development. Japan developed the high level technology, but we have also acquired and developed other type of high technology related to mining industry, processing and so on. Japan now has a high level of technology, but we also now have this recycling and recovery technology contributing to the sustainable, the society, recycling based society and environment protection, conservation technology, namely the clean environment technology now is the world top level for Japan. The majority of the mines in Japan were closed down but still Japan has the technology related to mining industry, and we are still active in using the technology. I told you about over the last 150 years of history of the development of mines in Besshi, Osarizawa, and so on from Meiji era to present, and we have developed, nurtured, and accumulated technology over those years and now we are the candidate in the list of the industrial heritage sites, and then I think this technology aspect is quite significant as well. Thank you very much for your attention.

(Piotrowska) Thank you very much and I would like to thank all the speakers for wonderful presentations. Unfortunately, we do not have time for questions, but if I might ask you to clap once by your hands to thank you all. We still have 5 minutes for coffee break.

You are very much invited and I would like also thank you all for this opportunity for me to be a Chairperson of this very interesting session on the very, very important subject as mining. Thank you very much.

Session 8: Digital Documentation (3D Laser Scanning and 4K)
Chairperson: Nobuya Suzuki (Ministry of General Affairs, Japan)
Vice-Chairman: Koko Kato (Coordinator for The Kyushu Yamaguchi Consortium Japan)

Introduction

(Suzuki) Good afternoon ladies and gentlemen, we would now like to start the Session number 8. The theme for this session is Digital Documentation (3D Laser Scanning and 4K) Interpretation and Accurate recording for the Future Conservation. Up to Session 7, we heard about the steel and coal

industry as well as the Gunkanjima specific industrial heritage sites and some of the contents of the industrial heritage but in Session 8, we have a certainly different perspective to deal with this topic with regard to all those heritages how we can conserve them by applying the state of the art technologies especially digital technology and how we can present that. That is the focus.

I was asked to serve as the sort of MC Chairman of this session. My name is Nobuya Suzuki of Ministry of General Affairs. Thank you very much for giving me this opportunity to chair this session. I am from the Information and Communications Bureau and I am a specialist of the information and communications technology, but we have the specialist of the industrial heritage. Ms. Kato is specialist and she is also the co-chair and she will tell us about the significance of digital conservation and recording as well.

(Kato) Good afternoon. For the last two days, I am sure you have dedicated yourself to the sessions and you must be got tired, but this session 8 is a concluding session of this international conference.

At this session 8, we talk about 3D and 4K, the digital documentation and so forth. That is the theme and one of the reasons why we chose this topic is because that during Meiji era of course industrial revolution heritages are sometimes the ones that include active ones which are still used. Gunkanjima is another one which is now ruined and every day, the degradation of that facility occurs. After the typhoon struck the island, on the next day, I went to the island. Nagasaki City was trying to promote the tourists and then they have set up the all that breakwater and fences for the sake of the tourists around the pier, but you see all this concrete debris was scattered around and fence newly rebuilt was damaged, so natural disaster is so powerful. At Gunkanjima island session, we saw the picture by Yuko but there you see that the big waves and tides hitting Gunkanjima. That kind of small island exposed to the natural disaster and every day, the facility is degraded. How can we conserve the heritage sites exposed to such natural disaster and then calamities and so forth, it is a major challenge for us.

This kind of digital method is not the almighty solution, but in order to promote the future conservation/management, this might show us one of the important criteria. It could be used as an important tool, in other words the accurate record must be kept like what is happening to the structure today. Proper recording and maintenance and archiving of that industrial heritage would show us a clue for the solution for the future and we have to be prepared for that. Science and technology are developing everyday very fast and actually in Japan, we have 3D and 4K and laser scanning and all these high-tech is so abundant here in Japan. We will hear the talk by Ms. Lyn from Scotland. Scottish Ten will be talked about later but in the Scottish Ten, we have seen the demonstration 3D laser scanning technology. It is really wonderful, fantastic laser scanning in Scotland. Japanese people are trying different 3D laser scanning but when you share that view of Scotland case, so far we did not really have that kind of a need identified. That is a very accurate precise laser scanning. It was not really sought after in the past but now a new kind of 3D laser scanning is explored. For the Japanese researches in this area and for the people engaged in serving and measurement, this kind of technology is a new thing to develop a new frontier especially those who are engaged in heritage related businesses and active operating assets are very important and proper recording of the structure

and relics a crucial mission. We must appropriately use this kind of a scanning technology.

Mr. Amioka and Epson members present today. You have seen some display posters today. We had a glass board, actually one century old one. It is wrapped with a paper, so Yawata protected and conserved that. It is a historically important document. It is a glass plate, very important one, but thanks to Epson's technology, that has been recorded in a new medium for the first time and that is used for the heritage recommendation document as well as for the conservation and management plan. What should be managed could be facilitated by this new technology. It is a very important tool for conservation.

Finally, of course, we hear about 4K; Mr. Suzuki is a promoter of this 4K at his Ministry. Today Sony extended a great assistance and Sony's state of the art huge big screen was provided to this room. We will be able to actually see the special version shot just for this session. It is a demonstration film and producer Mr. Murakami is here. Despite the heavy rain and heavy rain warning, he went all the way to Nagasaki to shoot that film. You can really experience what this 4K is.

The active operating asset is important, like crane, it is so hard for you to climb up the top and to see, so you cannot directly see, but you can really experience that. It may be one of the means for interpretation for the sake of the conservation. Globally, Sony's excellent 4K technology could be applied; Sony technology could be fully utilized and applied for the cultural asset protection and heritage protection, and we would like to support such technology as well. Of course, we are trying to protect the industrial heritage of Meiji and then we would like to apply this kind of technology to all the heritages and heritage sites as well.

The first, the chair Suzuki will kick off the meeting and there are other speakers who will present.

(Suzuki) Thank you very much Ms. Kato.

Now we would like to introduce the special speakers but before we hear their presentation, let me take the floor briefly on the 3D 4K because 3D is something you are familiar with, but some people might never have heard the word '4K.' What really is 4K? May I make a very short introductory remark on what is 4K? Please look at the slide.

#1

This shows the digital conservation for industrial heritage sites and what is the significance of 4K? It is a cultural asset which is a shared common asset of humanity or human being. How can we enable the publishing that to the broad audience and keep it for the sake of the future generations.

So, conservation is crucial to achieve this goal. When we talk about conservation, there are two perspectives. The first point is the maintenance of existing building structures, conservation/management or repair of the building and structures. That is the one way of conservation.

The second way of conservation is in red letters, digital recording. Now we are shifting from the analog technology to digital technology. We can keep that eternally for the sake of the future in the digital recording medium. As Ms. Kato mentioned about these performing assets or active assets that could be recorded in digital medium and then could be published and exhibited.

As shown at the bottom, digital recording should maximally use the available technology, and one

of the examples would be 3D laser scanning and 4K.

#2

So, what is 4K? The bottom one shows 2K versus 4K. 2K is currently available of resolution for high vision TV broadcasting. The resolution is about 2 million pixels and you can see the vertical and horizontal pixels multiplied in 2,000 by 1,000, so it is about 2 million when you multiply them, and the horizontal pixel 1920, which is about 2,000; you see K stands for 1,000. 2K is because of these 2 million pixels but on the other hand in comparison, what is 4K? It is a horizontal pixel 3,840, about 4,000 pixels, multiplied by 2,000 vertically. 4,000 by 2,000, it is 8 million pixels in the resolution. So far in the 2 million pixel era of TV set, it is double for each side, so in total, four times more or higher definition recording or the viewing is now feasible by 4K. Already 2K is available in different broadcasting of different countries, but 4K started in the movie world, motion picture and then the test trial broadcasting just started in Japan.

#3

In the world of 4K, the high definition, the details, are not all that definition but it is unique because in this method, it now enables wider color space. In the color range, the triangle is seen here. Compared to conventional color, broader color range is now expressed by this wider color space. Especially green and blue colors in the past were not really identical to the real colors. Expressible colors were limited in the past but now broader range of colors is feasible. In other words, a real, true green can be expressed. More faithful color expression and representation is possible.

The second point is higher frame rate. It is now possible. So far in the so called high vision TV, it was 30 frames per second, but now, it is enhanced by 4K. In the new system, it is maximum 120 frames per second. It is a higher frame rate possible. Very rapid motion can be clearly shown without blurring.

The third point is the color grades. So far, only 16 million colors were available, but now in 4K, one billion colors are available. It is a very smooth gradation of color to be expressed and more natural images can be expressed; not just high definition details but in this 4K technology, the more realistic faithful pictures with a higher and accurate movement can be presented and shown.

#4

The 4K technology, trial broadcasting has already started and it could be applied to many other areas. Application is so numerous, for example, broadcasting and medical application. It is similar to the macroscopic view so that the endoscopy is another area that the 4K camera could be inserted in the body and then more accurate diagnosis is possible by the endoscopic system or medical monitors the area of the application. Lay out a design for CAD and other designing: more accurate designing is possible. At the bottom, crime prevention monitoring for the enhanced security; this is the new security monitoring cameras. So far individual photos might have been shown in more blurred way, but detailed facial expressions can be accurately monitored. To the left yellow card areas, education and science is the major application area, the culture, archives and so forth where the 4K technology can be actively used.

#5

Specifically for the 4K, the demand started from forecasting, but how this will become popular and what is the demand forecast? In 2013, the 980,000 units of TV sets were available and by 2018, 67 million units are likely to be available. The rapid growth of demand is expected. Generally speaking, the total TV set demand will not be that different, but 4K demand will expand globally.

#6

This slide shows domestic 4K TV situation and prediction in Japan. The 2K high vision demand, the sales will be already reversed in other by 4K domestically in 2017. As a display, 4K will be accepted at home. As a display function, the 4K will be available. In culture, art, and the industrial heritage conservation, the 4K technology could be fully applied.

#7

In Japan on the 2nd of June, the 4K trial broadcasting started. It is not yet available for terrestrial broadcasting. You have to have a special antenna to see the CS SKY PerfecTV! Premium Service programs. The communication satellite test broadcasting started in June this year. Tuners of course are available at mass merchandisers and it could be now received at each home. It is 4K. The satellite test broadcasting starts here in Japan for the first time, so 4K new technology is now promoted by Japan.

#8

This is test broadcasting. These are examples of what kinds of TV programs are aired. Especially among those TV programs, Paul McCartney and ALICE, the famous artists' concerts, drama, or the sports, baseball TV broadcasting of the Giants and so on, the World Heritage is in the center. TBS is promoting the 4K technology applied to shoot the view of The World Heritage. More accurate and high definition, the expression is now achieved by these kinds of new broadcasting initiatives.

#9

I showed you TV programming and 4K application, but the 4K showing could be applied to other broadcasting than just TV broadcasting because last year actually they have shot a film at the National Museum of Western Art. They had exhibition of the Michelangelo's *The Last Judgment*, the ceiling painting and wall painting exhibition which was recorded in 4K and shown in 250-inch high resolution 4K screen. That was the first initiative.

The second one is the Rock Garden, Ryoanji Temple in Kyoto. Video of the Rock Garden's four seasons were recorded in 4K and it was shown in large scale screen.

At the bottom, you see Kyoto Cultural Heritage Archive Project; it called the 17 temples and castles and so on in Kyoto and shot by the 4K, and archiving was done. This is another initiative.

Some of you might not have heard of those applications 4K technologies yet, but broadcasting started this 4K. It showed an expanded scope of application in many other areas as the digital media

for the cultural heritage and then industrial heritage. Thank you.

Now we would like to introduce the main speakers today. First of all, I would like to call upon Mr. Amioka of Nippon Steel & Sumitomo Metal Corporation and Mr. Iwamoto of Seiko Epson to talk about the project to restore the images from the old dry plates of the Yawata Steel Works and to digitalized image.

Report of the Project to Restore the Images from Old Photographic Glass Dry Plates of Yawata Steel Works to Turn the Images into Digital Image Data and to Print the Photograph with the Digital Inkjet Printer

Kenji Amioka (General Manager, Head of Department, Project Planning Dept. General Administration Div., Nippon Steel & Sumitomo Metal Corporation)

Kohei Iwamoto (Seiko Epson Corp, Commercial Printer Operations Division, Commercial Printer Products Department, Expert/The Society of Photography and Imaging of Japan, specialist)

(Amioka) Good afternoon ladies and gentlemen. Allow me to start our presentation.

Yawata Steel Works keeps photographic dry plates and we are projectors to digitalize the image and both of us together will make the presentation. My name is Amioka from Nippon Steel & Sumitomo Metal. As an owner of these glass plates of the Yawata Steel Works, I would like to make the presentation. For the digitalization, technological development is done by Seiko Epson, so for that part, Mr. Iwamoto is kind enough to come with me and make the presentation.

#3

First, about the photographic plates of Yawata Steel Works; let me just briefly introduce you.

#4

In 1901, Yawata Steel Works began operation as the first state run steel making plant in Japan and since then, it has been playing a leading role of Japan steel industry consistently. Yawata Steel Works continues to evolve as a most innovative core steel mill of Nippon Steel & Sumitomo Metal that is pursuing world leading technologies and manufacturing capabilities.

#5

Now what we are talking about is Japan Meiji Industrial Revolution sites and components or facilities of Yawata Steel Works which Japan recommended as the component parts of the world heritages, these four, First Head Office, Repair Shop, Former Forge Shop, and Pump Station.

#6

Former Forge Shop; the design and steelworks was made by G.H.H in 1900, and after that, it was relocated and used as the product laboratory. Today, the building is used as an archive for storage of about 40,000 valuable documents and data from the time the Yawata Steel Works was established.

#7

It includes old documents and the gate plates and many items. About 40,000 different items are stored. Including in there is the original plate of the photographic dry plates.

#8

These plates are stored in special boxes; each containing about 10 pieces, and there are 5,312 pieces of such plates in total, the largest in number most likely in Japan in archives.

#9

We have been holding these plates but it has been there for more than 100 years. We needed to look at the degradation level and we tried to come up with the best ideas to maintain them. Since it was designated as the Japanese Industrial Modernization Heritage, we are trying to identify that the important contents are included or not and we asked a question to the images of these plates suffice as evidence of the world heritage registration, but if they remain as the plates as themselves, it would be difficult to analyze further. So we thought that this goes beyond the work of the Yawata Steel Works and it so happened that close to Yawata Steel Works, there is Seiko Epson's office. We asked them to go ahead with the digitalization of the images on these dry plates.

#10

(Iwamoto) On request from the Nippon Steel & Sumitomo Metal Corporation, we are asked to set up the project. The Managing Director there gave us the instructions to go ahead with this project.

#11

Allow me to introduce Seiko Epson. I asked the IR office for documents and I received this. It only shows the financial data like sales and so forth because there is this strict rule of the company to show certain data in a certain manner, so I just have to show you this.

#12

We are involved in various business activities and we belong here. This is the large commercial printers. In this particular section, there is this technological development and as person involved in this technological innovation headquarters, we were involved in this project.

#13

I was asked to take a look at it. I should not touch and destroy it, so in October 2009, I took one month to do the preliminary research with project samples of photo plates and tried to come up with the best way to go forward. We checked about 50 samples and looked at how the images looked and how the conditions were, and after that, we started our actual work, but there are so many plates and we could not rush. We took about 18 months in three different periods, each period handling about 1,000 pieces.

We proceeded with our work and these plates are originally negative and it is a mirror image, so you have to look at the data and, you need to change it to the positive images to make it like a normal

photo. The third stage is to print the image on the paper. So these are the three challenges we have faced and I will come back to this for more details later why we have to go through these three steps.

#14

We confirmed the current situation. We were surprised that they were kept in good conditions every single plate. As Ms. Kato says, there are papers sandwiched between, so that the plates do not touch each other and they were stored in special box and have a special shelf to put those boxes on. Mr. Amioka said that they are just casually placed, but I am sure that they had been handled with great care. What I thought because in the steel industry, they were doing casual job, but no, they did a very thorough, careful job.

Another point is that plates themselves' higher quality; we are talking about tens of millions of pixels, but even if the pixels become 100 million pixels, we could still make the images from the plates.

But it has been there for more than 100 years. There is a gelatin applied over the plates for protection, but all the moistures were gone and very dry, so lightest touch can break the surface. We are afraid to do that, so our first challenge was how to handle this with care. As I said because there are papers in between, they were not stuck with each other. Each one could be separated quite clearly, so we could take one by one from Meiji era to the middle of Showa era when there was not enough materials going around. Papers were there of course, but some of them – newspapers or the used papers that somebody scribbled on and some of them did some negative affect, but for all the time, they did place papers in between.

What was most surprising was that it was serially numbered from number one to the very last plate in a beautiful handwriting. There are records of the time and the places but even if there is disorder in the order of the numbers, we can just renumber them according to the recorded numbers and we could identify the time and place of the photos of the plates, but what was most difficult was that the handwriting was so beautifully done, it was difficult to decipher some of them.

#15

The plates are of two types. One is 10x12 inches. They were back from the Meiji era to the beginning of the Showa, 3,539 pieces are like that. Another type is the smaller one 4x6 inches and they were the plates from the middle Asia of Showa era by making it smaller, but because the camera used to be fixed and with the shutters, the cameras started to become portable and that is why the plates size became smaller as well. These smaller ones from the middle of Showa, you can see dynamic images, but the larger ones were like commemorative photos and everyone was asked to stay for 30 seconds motionless, a very interesting photo culture.

#16

However, some of them were degraded, so bad. The most important thing is that discoloration or de-coloration or exfoliation and the glass itself broken, some of them were like that because of the degradation overtime.

There were reasons for the degradation and we surmised; one of them was that those bad ones or the worst ones must have been very popular plates because over and over again, they were printed over

papers. Usually in contact, this sensitized paper is attached to the plate to take the images and then the developing agent still remained. That may have been the cause of the degradation, so more important photos tend to be damaged badly.

What we are most concerned about is to apply the least physical stress to the plates. That was our basic policy.

#17

PSO graph is the technique we used just like that. We decided to handle this place according to the standard applied to the artworks reproduction. We chose a way not to give damage to these plates, least damage. There is so much data included in the plates. If we try to extract the 4K level of a data, we need to have the high resolution data formulation and printing. In selecting the devices, we selected non-contact type; the scanner should not touch the emulsion there. The second, these plates should stay in the archive, cannot leave the archive. X-ray devices is one option, but to take out the plates to outside is so dangerous, risky, so we tried to set up a portable device which can be brought into the archive.

#18

The scanners and the cameras are the two types of devices but this time we tried to choose non-contact type, less stress to the plates. In case of scanners, the emulsion layer has to be in touch with the plate underneath, so we chose the camera type.

#19

The plates have the very thick emulsion there. When they took the shot, the silver reacted and when they washed it away, there is this uneven surface on the emulsion there that is how the image is created. If there is the diagonal lighting even if there is no color, but because of this slanting of the rays or the lighting, probably we can take out the image. We tried to have the three directional lighting from beneath and slanting the diagonal lighting and we succeeded in that way and this is the device in the archive.

#20

Actually, it is a large-sized camera which is used for commercial advertisement. Fifty million yen is the cost of one unit. It is called medium format Brownie and then we came up with the medical field.

When there is a surgical operation, certain camera is used and the lighting is selected to be safe against the human body, so we combined these two. For medical purposes, the seller was curious to know what we are going to use it for. We said it was a secret and they were imagining things, but anyway, we brought this in and assembled the device and tried to do our thing.

#21

Now the work itself, the plates were placed gently on the table and we had cushions placed everywhere, a soft surface so that they would not break even if we were to drop the plates and the

measurement was done from a distance. It was PC controlled and everything was done by us in such a way.

#22-23

Now the data we collected is shown here. I think people can see it. The first one we took was a negative and then was the data which reversed the right and left.

If it is a good image has been often used and so it is very difficult to get the image and therefore, we added then some darkness, lightness, and reversed rotated it and this is how we acquired the image like this.

#24-25

This is a blast furnace and there is a person in the photo. There are many such photos. It is a very detailed image and therefore, we were wondering if we could capture this image, but we divided this into four, 50 million pixels divided by 4 and so 50 million multiplied by 4 would be more, but we cannot do it, so we divided into 4 and we expanded, blew it up like this and therefore we see the figures, the people.

#26-27

This is 100 years ago and yet we could see very clearly their faces and the second from the left, it is not blurred, but this person could not stand still for 30 seconds, he moved his head. Therefore, it is blurred like that.

It is not a problem with the photo. On the right hand side, you see a child, a boy and we wonder what this is all about. If you look up close, it seems that it is a family of the German engineer.

It is his son appearing in the photograph and next to him is the first head of the Yawata Steel Works or rather Mr. Wada, who is the second head of the Steel Works. According to Yawata record, it was a commemorative photo commemorated at the start of the blast furnace on February 5th, 1905 and then this was revived for the first time in 100 years and we only had a small photo which was printed on to the photo paper. It is the first time that we saw it like this in the large image.

#28-30

There are others which the colors have faded, totally white and therefore using the method I explained, using both the transmitted light and reflected light and gradually step by step, we start to see the image like this and by combining them together, this is Yawata Steel Works and this is the total image as seen from the sea.

#31

Mow, this is an extra photo. We found these strangely faced people. You see these patterns on the faces. We wondered what this was all about and we investigated. Now the image itself had lost color, it was decolorized, but it seems like this expert tried to use a brush to retouch it. I think black ink was used for it.

#32

If you look up closely, you can see something like this and using Photoshop you can do retouch on the PC and you can remove your wrinkles and to do some cosmetics, but from 1905, this photographer seems to have used this very fine Japanese brush to try to remove the wrinkles on the face. There were quite a few photographs which look like that. So yes, they were doing a lot of retouch even back then. This might be Japan's very first retouch. I think that this is quite interesting and the photographers I said that looking into this very carefully and I have been instructed to carry out a full analysis since people are very interested.

#33

We have come to know a lot of things. What is most important is that there are serial numbers and information on the location and date on the plates and this is very helpful in understanding the photographs. The person who took the documentary photograph probably was not aware of this but this was outstanding. As the documentary photograph, we were able to use this and we are able to find out the details of the people who appear in the photograph and at the same time, we can learn about the historic transition of the photographic technology and so 5,312 photographs have been resorted like this.

#34

(Amioka) Now you see the restored data. What did we find out? I would like to introduce some of the examples.

#35-36

This is the year 1900, April 24th. Prime Minister Hirofumi Ito had visited this site and this appears in the history textbooks of Japan, but you do not know who is who but using this digitization technology, we can see who appears in the photograph.

#37

The first row and the middle and left are the Choshu Five, Hirofumi Ito, Kaoru Inoue, and also Michitaro Ohshimao, who is the son of Takato Ohshima. He was the head of Yawata Steel Works and behind Hirofumi Ito, Takichi Aso; he is the grand grandfather of Taro Aso. Also, Kenjiro Matsumoto; he was an industrialist and he became the head of the Meiji Senmon Gakko (Meiji Vocational School) and the founder of Yasukawa Electric Corporation, etcetera. Behind Takichi Aso in the back is Denemon Ito, a drama *Hanako to Anne* character's father, appears in this photograph.

You can see that the Choshu Five appears in the photo and you see this connection with Kamaishi with Ohshima and there is the connection with the coal industry. The photo just tells you a lot about what was happening then in the Meiji period. This is a very symbolic photograph and showing the connection amongst all the major figures.

#40

About the world heritage: this is 1899, but we have to show the dates and this is the First Head

Office, Repair Shop and the Former Forge Shop. We could prove that these did exist back in 1899 and this is one of the evidence of values where they have become a world heritage.

#41

This is the other repair shop.

#42

If you look up this photograph close, you see one thing, the crane; the serial number shows that is the German Louisburg plate, and this also appears in the crane used today meaning that the crane has been in operation for more than 100 years.

#43

Also, in this photograph, you see the power lathe. Then again at Yawata Steel Works, the right hand color photo, you see that it is still in use at a separate location in the works. This 15-ton crane and also the lathe and others have been in operation for more than 100 years and this has been proven by these photographs.

#44

This is an extra slide. US made locomotives were introduced. On the left hand side, you see the dry plate photo and you cannot understand what is what by looking of course. By having a close up, you see that it is a unique locomotive and it uses the umbrella shaped gear to transmit the driver force. It is called shay locomotive.

#45

These documents which can be used as evidence as world heritage value and the documents themselves have a very high value as historical materials. Therefore, we want to use this for research purposes and if possible, open the materials to the public.

#46-47

(Iwamoto) Lastly, as I have been saying, we think that the dry plate does carry a lot of information. Therefore, even if it is deteriorated, it is possible to restore the information. The plates are just left there, but we have to recognize their value and the possibility that a lot of information may be stored there. In those days, there were no copiers and therefore if you need to keep records, in many cases they took photographs. It is highly likely that such evidence is included in these records, photographs and by analyzing, we can find out a lot of things.

#48

As for the storage, we had this newly made storage box and paper used for protection, but we had to think more carefully about the storage method. We have to think about how to keep these plates so that they can be handed down to future generations 100-200 years from now. In this project, we saved the data in HDD, DVD, and inkjet prints. We have to think about which is the best method to

store this information. There are different images and different ways of thinking, different opinions but again, you have to study what would be the best way, which media and which methods should be used to save the data.

#49

(Amioka) This ends our presentation, but lastly, this is not directly linked to what we have presented, but having been engaged in this project and also as the owner of this heritage asset, I would like to talk about the following.

#50

At Yawata Steel Works, we have tried to receive a number of visitors to our steelworks for the sake of world heritage site inscription and we have had many of you come as well. We give the explanation, we always talk about the following. We say Yawata or revolution Yawata-Kitakyushu is not done, is not in the past tense. Is still ongoing beyond century. This is something that we always say.

#51-52

Now the reason why we say so is because in 1901, it was born as steelworks and therefore, it is regarded as one of the birthplace of Japan's industrial revolution but ever since we have led the industrial revolution and in Northern Kyushu, automobile, IT, robot industries are very advanced industries. Therefore, it is the manufacturing capital, not just steel capital.

#53

In the 21st century, we have become the capital for eco-model. In the photo, we see that the then Prime Minister Taro Aso and in the old photograph, you saw his grand grandfather when he visited the steelworks but Prime Minister Aso did come to Kitakyushu commemorating this lecture of Kitakyushu as an eco-model city.

#54

There is the OECD Green City Program. Paris, Chicago, Stockholm as well as Kitakyushu were selected as Green City Program City. Kitakyushu is the first city in Asia to be selected.

#55

Therefore Kitakyushu is now considered the world heritage site candidate, but we are still leading an industrial revolution and we are doing lot of sustainable development and the city on the whole is engaged in such efforts. Kitakyushu Yawata, we are moving from the birthplace of Japan's Industrial Revolution to Global Green Revolution.

#56

It is not just the birthplace of Japan's Industrial Revolution, but we want to become the birthplace of the Global Green Revolution. Having said that, we sincerely hope that Kitakyushu and these sites

will be scripted as the world heritage site; this will give hope to the people of Kitakyushu and Yawata. We think that the evolution of our city will lead it to Global Green Revolution. We seek for your support. Thank you.

(Suzuki) Thank you very much for your very informative discussions including the restored images, which are very valuable. This is a good opportunity for anyone to ask questions. Yes, I see a hand.

(Stuart) Thank you very much for your talk. It was extremely interesting. In Australia, these photos of historic sites are often put onto the internet, so that the people who are interested in the history and their family history can get access to them. Is there a plan for these valuable photos to be placed in the internet or for people to have public access to them?

(Amioka) We digitalized the image already, but some of them were people's photographs where there are copyrights and portraits rights issues and we are working on it. Inclusive of those rights issues, we need to talk with the local governments and the central governments. Our aim ultimately is to try to have the public access to the images. That is how we aim at. Thank you.

(Suzuki) Having answered your question, thank you, anything else? No questions. Thank you very much.

Now we will proceed to the next presentation, Dr. Lyn Wilson, Digital Documentation of Global Heritage: The Scottish Ten and the Industrial Projects.

(Kato) Earlier at the Nippon Steel's discussions about the digitalization of the images with the help of the Epson Corporation, the recommendations photos this time and the digest versions of photos that you have were created, thanks to their cooperation. As a prerequisite for formulating CMP submitted to UNESCO, these photos are quite instrumental. For the conservation of the world heritage, this will contribute too much.

Before introducing Dr. Lyn, as she speaks about Scottish Ten project, this National Council of the Industrial Heritage, we support the idea of 3D laser scanning. For the working facilities, laser scanning will become more and more necessary. State of the art technology, here 3D laser scanning is done in Japan. The software to analyze that, we are sending this to overseas for analysis, so we are looking forward to listening to the state of the art project in Scotland.

Digital Documentation of Global Heritage: The Scottish Ten and Industrial Projects
Dr. Lyn Wilson (Historic Scotland, Conservation Directorate, United Kingdom)

Thank you. Cheers for that introduction and thank you to the Conference Committee for the kind invitation to come and speak at the conference here. Today, I will talk about 3D digital documentation of heritage sites around the world focusing on our Scottish Ten initiative and also our industrial heritage projects.

#2

I am the Digital Documentation Manager, Historic Scotland which is Scotland's National Heritage Agency. We look after 345 sites across Scotland and we lead the way in traditional skills and energy efficiency, climate change, and also digital documentation of our heritage.

#3-4

All of the work that we do in digital documentation is carried out in partnership with the digital design studio at Glasgow School of Art who are experts in 3D data capture and visualization. Together, we have formed a partnership called Center for Digital Documentation and Visualization through which we deliver these projects.

#5-6

We use a range of digital documentation techniques and technologies to capture the heritage, but at the core of this is 3D laser scanning. The laser scanners are fast non-contact methods for documenting our heritage digitally. The laser measures up to 1 million coordinate points every second and quickly creates what is called a point cloud. That is what you have just seen on screen. This is measurable and we can also convert it into a model which you see here now. We collect many separate scans and join these together to create one overall point cloud. We also take high dynamic range photos and we overlay these onto the processed point cloud to give a photorealistic model as you can see here.

#7

The Scottish Ten project began in 2009 and uses cutting edge technology to create accurate 3D models of the five world heritage sites in Scotland and also five international heritage sites in order to better conserve and manage them.

The project is fully funded by the Scottish Government. We work in partnership with CyArk on the Scottish Ten project who are an American charity set up by Ben Kacyra, one of the inventors of the first laser scanner, and our project contributes to their mission to digitally preserve heritage sites around the world and to share them over the internet.

#8

The five world heritage sites in Scotland: New Lanark which is an 18th century cotton mill and associated village, so an industrial heritage site. The Heart of Neolithic Orkney which has a collection of sites over some 5,000 years old. St Kilda which is a remote island chain inhabited until the 1930s and this is the UK's only natural and cultural heritage site. The Old and New Towns of Edinburgh is the capital city of Scotland which contains an organic medieval old part and a planned new town. Finally, The Antonine Wall which is the northern frontier of the Roman Empire and we have been making good progress and have completed the data capture phase for all of these sites.

#9

The international sites in the Scottish Ten project are decided in collaboration and discussion with

our colleagues at Scottish Government. They are in countries where we want to build close partnerships between Scotland and the other country. It is also where we want to help build capacity in that country through knowledge and expertise transfer.

Importantly, the data is gifted to the international partner from the Scottish people so that the international country can use the data to help conserve their heritage better.

#10

We have been fortunate to work in some wonderful countries and wonderful heritage projects. Mount Rushmore in the USA we worked on in 2009, Rani ki Vav in India in 2010, the Eastern Qing Dynasty Tombs in 2012 in China, Sydney Opera House in Australia in 2013, and one final site still to be announced.

#11

Each international site should pose a set of unique challenges for our team and push our expertise to new levels.

#12

Mount Rushmore was certainly a challenge and we had to work with rope access teams to capture all leaders of the mountain sculpture. Our work at Mount Rushmore featured in the National Geographic magazine in December 2013.

#13

Our project in India at Rani ki Vav also featured in National Geographic. This is an incredible site over 1,000 years old.

#14

It is a communal step-well or water source comprised of seven terraced levels descending into the ground.

#15

The well is completely covered in ornate sculptures showing Hindu deities and Gods and there are over 400 of these one meter high sculptures. The main challenge of this site then was to record all of these sculptures at high resolution.

#16

Rani ki Vav was on the tentative UNESCO world heritage list when we carried out the project in 2010. We worked on site in partnership with the Archaeological Survey of India and the digital documentation fed into the management plan and the nomination document. Just last month in Doha, Rani ki Vav was awarded full UNESCO World Heritage Status and we are very happy that our digital documentation work was able to contribute to this status.

#17

In 2013, our team travelled to Australia to digitally record the Sydney Opera House. Here, our aim was to capture 100% of the exterior shells but also the interior performance spaces. This was a real challenge as this is a living, working, and very busy site.

#18

Our objectives at this project were to complete an accurate as built survey. There are no accurate documents of the building as it currently exists. We wanted to provide a tool for facilities management and the Sydney Opera House is now using this data as a building information model. We were also to provide a model for educational and interpretation use and finally, the model was to be used as a preventative conservation tool.

#19

To allow us to document all of the exterior, we developed unique and bespoke rigs to enable us to capture all of the hidden areas. This allowed us to capture areas which were not able to be seen from either above or below.

#20

We also worked very closely with the rope access team at Sydney Opera House who abseiled down the shelves to capture data from missing voids.

#21-23

We produced a series of point cloud images showing the exterior of the Opera House and also the interior performance spaces. This is the concert hall and one overall point cloud tying the interior with the exterior. This show reel gets a quick overview of the project.

It is important for us to capture the surrounding context of a site to tie it all together, and here we worked with a local survey partner who had a very long-range scanner to document all of Sydney Harbor.

#24

Once we have our point cloud, we also then created a 3D model from this and we are now working with Sydney Opera House to ensure they get the maximum benefit from the models and use them practically in the management of the site.

#27

Moving on, I would now like to talk a little about the industrial heritage projects we have been involved with.

#28

Digital documentation using our 3D technologies is particularly suited to industrial heritage structures given how complex they are and how difficult they are to survey using more traditional

methods.

Glasgow in Scotland has a very rich shipbuilding past as most of you will be aware of and we are proactive in recording this industrial heritage on your doorstep. These cranes which were in the Govan shipyards in Glasgow were unfortunately demolished just a few months ago, but we were able to access them and create accurate 3D documentation records before that happened.

#29-33

While we have lost this heritage physically, we at least have an accurate three dimensional digital record of them and we can use this to re-tell the story of Glasgow's industrial past and pass this information onto new generations.

#34

We have four giant cantilever cranes in the west of Scotland and this one was recorded using laser scanners back in 2006 as part of a project to create an urban model for the city of Glasgow. The technology has moved on considerably since 2006, so this is a low resolution version of the point cloud, so we can produce these days.

At John Browns' shipyard in Glasgow where visitors can today visit the crane, we have created 3D models and digital interpretation to help visitors understand the history of the site here.

#35-36

A new visitor center is about to open at the Fairfield shipyard again in Glasgow and we have built 3D models to show the evolution of the site overtime. This will be presented to visitors on a large touch screen and there will be hotspots that visitors can touch to tell you more information about the site overtime.

#37

We heard earlier today from my colleague Dr. Oglethorpe about the challenge we are currently facing in Scotland on the Forth Bridge UNESCO World Heritage nomination. As part of the nomination in 2013, we carried out a pilot digital documentation project to digitally record part of the bridge.

#38

Over the course of five days, we captured over 100 separate scans using terrestrial scanners, but also boats and car mounted scanners. We captured over 3.5 billion measurable points and 85 gigabytes of high resolution photography.

#39-40

As with all our projects, we make sure that we access all areas to give us the best possible 3D result with health and safety always being at the forefront of remains. At the Forth Bridge, we scanned at the track level and also on the Top Members at the uppermost part of the bridge, here using the local abseil team to help us.

#41

The laser scanner was also mounted on the boat to help us capture areas that we would not have been able to access otherwise.

#42

The pilot project results are very promising and shows that the full project's documentation is possible.

#43

In fact, we were able to capture lower resolution data from the entire Forth Bridge and the adjacent Forth Road Bridge.

#44

We focused on high resolution data capture on the skewback which is structural component from which the cantilevers emerge.

#45

Using expert knowledge, archival imagery and historic texts, we wanted to show an interpretation element from our 3D data. From the point cloud, we created a model and then animated this to show how the skewback would have formed the basis for the cantilever and then the rest of the bridge. This show reel will give a summary of the projects and finish with the skewback construction.

<Video starts>

Similar to about the project we have just heard, we were able to access some wonderful glass plate negatives which our specialists were able to bring to life digitally and animate and give a 3D effect too.

This is one of the glass plate negatives and another here.

We were also able to access aerial laser scan detail which we incorporated our terrestrial data into to show the surrounding context of a site.

<Video ends>

The animation you can see now was created using accurate 3D laser scan data.

#48

The pilot digital document project has shown new potential for the use of this data in the Forth Bridge. It can be used for conservation purposes to give us an accurate as-built survey of the structure. It can also provide baseline data for future quantitative condition monitoring of the structure and it can also provide data for finite element analysis to highlight stresses or strains on particular areas of the bridge. It can be used in the management of the site by providing building

information models and facility management tools. It can assist with UNESCO World Heritage nominations. We can develop virtual health and safety tools and site familiarization tools for working living sites.

Learning and interpretation, we can develop tools from these 3D models to help understand these sites better and to share them with other people.

Virtual tourism is an important and powerful thing that the digital documentation can help with. We heard yesterday that some of the sites in the Meiji Industrial Heritage Revolution nomination may not be publicly accessible. So by providing virtual tours to some of these sites, we can help people to understand and access them.

It can help with politics as well. In Scotland, the digital work contributes to the National Performance Framework for education, for heritage, and national identity.

Finally, there is scope for using this data within the gaming industry and entertainment industry and of course this list does not only apply to the Forth Bridge, but to all heritage sites whether living and working or abandoned.

#49

If you would like any more information about our projects, the website address is here and also our Twitter address and I have a book here if anyone would like to see some more of our images at the end of the presentation.

#50

Thank you for listening and I am happy to take any questions.

(Kato) Thank you very much. We have heard about this working on the heritage and the conservation management plan. There is 3D data scanning is included and so that in the future especially if it is a working place for the people, maybe the interpretation is important because in education programs that has to be understood well and it is one of the important tools for the conservation that management does work, so it is a very important tool that she mentioned.

We would like to introduce next speaker now about the 4K who will tell us about the Ultra HDTV for Industrial Heritage Conservation. The speaker is Professor Tamegaya of the Joshibi University of Art and Design.

4D Digital Documentation of Working Sites

Hideichi Tamegaya (Joshibi University of Art and Design, Japan)

Thank you very much. I am Tamegaya. Thank you very much for the Scottish wonderful 3D model presentation because in reality it is so wonderfully expressed by Scottish example. The documentation was so wonderful. I was so impressed by the Scottish case presentation. I should not end there just saying that I was impressed.

#2

I would like to start my presentation but in Japan, we have developed the high definition television (HDTV). From 1980 computer graphics, image processing technology started to be used in producing TV programs and we were looking into how we could apply these technologies to television. Shortly up until around 2000, I was doing that work and then I moved to this art university trying to communicate this technology to people in the field of art. I have been supporting a number of projects.

I am an engineer at heart and I moved to University of Art and I was wondering how I could communicate to the art students, but without technology these days, you cannot express art fully. That is the condition today and therefore I constantly have to get my students to see what this state of the art technology is from where I want them to think about how to express their art. At the same time, while we use video, you should sense the feeling of documentary, so that this technology and this art expression combine together. That is the type of work that I am engaged in.

#3

It is something that is expressed here in English but I would not dwell on this.

#4

In my career, digital archive is something that I have been working on and I have been working on the projects using high definition technology for industrial heritage conservation. I would like to talk therefore about my thoughts on how these technologies can be used at archives.

#5

This so happens to the project that I was engaged in. This is in the art museum of the university. It was a collection. This is the reproduction of murals at the Golden Hall of Horyuji Temple and this was kept at an art museum of a university. Students were able to see these exhibits, these reproduced images and because they are precise reproductions and because this is something that students have to learn from as to how this technology can link to art, I think this is an outstanding effort at the archives.

#6

Now on the glass plate, this has been recorded but they have reproduced it from the glass plate. As was earlier explained, photographs' resolution is very high these days and no matter how we try to enhance the resolution, I think photographs have outstanding features. You want to show this to the students and also express resolution that glass plates have, the grey scale, the dynamic range, and how this can be handed down to future generations. This is the message that we want to get across to our students.

#7

This is being communicated to students at the university. This is a collotype printing and we see that there is a high precision photograph technology and printing technology used to conserve these historical assets. We have these high resolution images or photographs, but these are still pictures.

They are being kept as still pictures, but we want to make them into video so that this can also be handed down to future generations.

#8

On the one hand, we have to physically conserve including the industrial heritage that we are talking about today. That is conservation. I mean it is important that you have something real that you can put your hands on, but at the same time, you have to have digital archiving. It has to be preserved and also not only preserve, but reproduced and made public. There needs to be such a program also in place.

The term "archive" has been used for some time, but this is something that has been accumulated as information; things that are manmade, and as the technology evolves, we want to make it digital and this is what is meant by digital archive.

The term "digital archive" came out at the time of the high definition television development and we want to record the images and because it was possible to do this digitally and digital imaging could be recorded, reproduced and made public, this is our thinking. Now high definition television was thought to be the state of the art technology in 1980s to 1990s when this technology was developed. Now, we are evolving to the next stage but back then that was thought to be state of the art technology.

#9

Now in the process of evolution, why 'digital archive' is becoming beneficial? This is because as a result of information communication technology (ICT). There was a question about why not put those photographs on the internet, but through ICT, we should make these images more accessible no matter where that person is. That means that digital archiving is something of utmost importance using ICT technology.

At the same time, the contents of the images, earlier, we talked about still photographs, but there are the high resolutions required in the still pictures but at the same time, we want to accumulate these images in the form of an archive video. This is beneficial because we can see how things develop overtime. There is a timeline added to the imagery and this is especially important for active heritage.

For presentation purposes, this is more interactive, accessible to the public and this is another attractive feature of digital video technologies.

#10

In the 1990 in a television program, our senior Yoshihiko Muraki showed Gunkanjima on high definition television. It was introduced as modern ruins, but Muraki-san gave a very important message. He said that what is important about these images is who at what time produced these images with what intention and just because you have taken photographs and images does not mean that it is a record. The images are very easy to capture these days and people tend to think that recording can be done easily, but having these images alone does not make it an archive or meaningful record.

Another thing is that the imagery on the video or film pictures need to be made public unless so it

will not function as an archive.

Another thing is how there was recorded need to be described in the form of data; this is linked to traceability. In order to be able to trace back who made those images for what purposes and when, that metadata needs to be in place at the same time as you record these images.

#11-12

Around 1998, I was engaged in various projects related to digital archive conservation of cultural heritage and 3D images. Using high definition television technology, I was doing these things. Those days, that was the latest video technology. Compared to conventional television, the resolution was much higher and we could produce wider range and that was thought to be the strength of high definition. Today, we have entered the next stage and as Mr. Suzuki explained about this, we have the 4K television today and the next step will be 8K TV. Even beyond that will be the future system; this is already being discussed.

As you can see, though it is broadcasting technology, the electronics technology advancement has enhanced our broadcasting. In line with the development of hardware, we have been able to enhance our contents.

#13-14

How to use these elements of HDTV? This will be a challenge in the future. This photograph was taken from outer space. This is a picture of earth. This was the first time that HDTV camera was installed onto the space shuttle. In the past using film camera or ordinary TV cameras, we did capture imagery of the earth but this is a high resolution and high definition television. Using this camera, we can see more detailed information about the earth. This is color information with high resolution, meaning that we can analyze in greater detail. This means that we can extract more information from these images which makes it even more meaningful. At the same time, it touches the hearts of people who see these images, and if you were to pursue the 3D reality expression, it ultimately will reach the point where it touches the hearts of people. This is where we can take advantage of this technology. We see these images have been taken from the shuttle and this is one important element of HDTV.

#15

However, we are now in the next phase as I said earlier. There is the ultra-high definition television standard and at International Telecommunication Union (ITU), this has been decided. The 4K is four times the resolution of HDTV, and another fourfold higher resolution, 8K higher definition television standard has been internationally decided. These two ultra-high definition televisions will be used in the media.

How we use it will be a key. I said that there are three elements, resolution, color digital representation, and the frame rate per second; 120, 60 were the different frame rates, but it is already 60 frames per second with 4K. So this is possible toady.

#16

What is the size of the 4K? On the left hand corner, this is the conventional television standard pixels and next HD is the number of pixels of the high definition television. Now we have 4K and it becomes this big. The fact that the size is bigger means if we use the same scale, the same number of pixels would look like this. If you think of this in the screen size, you can make the screen size larger, but if it is smaller, the picture density becomes denser and the quality of the imagery that is reproduced becomes different. You can include different elements, you can see different elements.

On the upper side is DCI. This is different from broadcasting, digital cinema; that is a first cinema standard. As comparison, you can see that the numbers of pixels are more or less the same and therefore using 4K, we often talk about this, but there is a slight difference between a cinema and television which I will hope that you will understand.

#17

This is the color expression range. It becomes broader and we have the standard in place. Using this standard, we want to create a system which will make this standard and this will make the color expression greater. This is a challenge that we have to tackle.

#18

Already here, there is the 4K display. It has already been made and it is possible to show television programs on the screen and already trial broadcasting has begun.

For broadcasting, there are different constraints like the radio wave and also the transmission bandwidth, etcetera. It is not the case where it goes straight to 4K and show a 4K image. We have to compress and do this operation to be in line with the bandwidth that we can use, but here the 4K display we are showing, the two or three images that we want to share are being directly shown on the 4K display. Rather than me talking, I think seeing is believing and I would like to show you the images. It is only here.

(Kato) What we are going to show you was specially made for this session and this is a good backup to explain about what Professor Tamegaya is saying. We wanted to show you our heritage. On a very rainy day, it was really a downpour and was a warning against the heavy rain, but thanks to everyone, Murakami-san from Fuji TV and other people cooperated with us, very quickly they came together and produced this film. When you make videos, we recommend that you take the videos in 4K. It took them 24 hours to do the 5-minute rendering. Editing is very challenging. I hope you enjoy the video.

(Tamegaya) Later, you will have another opportunity to look at it closely, but please enjoy this film.

<Video Playback>

(Kato) Thank you very much.

#19

(Tamegaya) It was overwhelming high quality which I am sure moves us all. This is a display which is already available as device and you can see this is a tablet size which enables 4K display already available.

#20

Also, this is a theatre type level and this is a movie area where this is already applied and so this could create a good quality theatre. There are many types of display or the display technology, and technologically there is enhanced availability of such technology. This can be used for your different presentations. 4K can be used for your archiving and that could be used for the publicity, promotion to general public and you can correct information and record the digital media which is very important.

#21

Let me skip through. Anyway, still the camera was there and the rendering took several hours. From camera to the display, a lot of technology and processes are needed. Therefore, the total system development is necessary in order to have the good quality image for archiving. So the 4K workflow is important and rapidly people are developing each part of this workflow and the value of using this kind of archive will be enhanced.

#22

This is the roadmap. The Ministry of General Affairs has shown this roadmap, but in the future, the image media is likely to go through this kind of evolution and then the national project is currently promoted with the focus effort.

#23

8K is called a Super Hi-Vision; it is another name for the 8K UHDTV. It is already approaching application level, the commercial use level and the people have the target date of Tokyo Olympic Games by when they will like to enable this technology.

#25

This is again the expanded version of that roadmap. This is possible extension size of that technology in the next generation.

#27

This is the technology, but how should we use such a technology? One demonstration was created. ASTRODESIGN created the system. 4K system should be wisely used. The ultra-computer graphics will be possible; 3D measured data will be used for the modeling. Then it could be introduced within the virtual museum, and maybe we can apply the technology for this kind of virtual museum.

#28-29

This is a simulation version computer graphics representation. It is like a walkthrough museum. You walk through this virtual museum, move around, and see these exhibited art pieces like the wall. This is archived data. High resolution printable level is now achievable and so recorded information is stored in this way. When you get closer to that art, the resolution level grows up and you can see it in high resolution.

Computer graphics and this kind of museum system are combined and a new kind of 4K utilization of material becomes possible, a virtual museum combined with the computer graphics. Virtual reality technology is combined NCG and high definition and super high definition and 4K system, all those could be combined in the future and now new kind of system will be presented to the consumers.

In the remote future, 3D model will be available because after scanning, the model will be placed into this kind of exhibition hall of the museum as Australian Sydney Opera House case was shown earlier in the example. That could be brought inside this virtual museum for the display. Different technologies could be combined that is the merit of digital media.

<Video Playback>

This is showing how to use the electronic media; the comments can be combined simultaneously with this virtual museum with a simple system. This can be combined and voice information and characters can be shown together. This is a trial simulation. Within that kind of a museum system 3D models or the archived images could be combined and inserted. New initiative can be born which is where the 3D model was integrated as the exhibit.

It is a 3D structure placed inside of a virtual museum and with the high resolution object. Then new kind of museum system can be created and by displaying that kind of a virtual museum, digitally archived ruins, the cultural heritages and so on can be displayed. It is a new method available for the exhibition, but what is important is still quality. Then 4K technology and other new imaging technology should be utilized.

Time is running short and I have to skip to the conclusion now.

#30

This is my conclusion. This way, it is not just accumulation of the images but different technologies should be combined. The keyword is combination. The digital technology has most advantage because it can combine and as an archive, this could be combined and accumulated. As the chair mentioned at the beginning that we have to do what we can do now, otherwise the heritages might disappear. You have to first record them with the effective way and 10 years from now, some of the unthinkable things can be achieved; something you put into the archive now could be utilized by the future generation like a digital version through the digital conversion. The future development of the image processing could enable this kind of thing, but that is up to the next generation. We have to preserve such things for the next generation people that is why the recording the current heritages and so on is very important in the archives. I am talking about evolution what we can do in our images evolving every day and archiving is crucial. What is the purpose of archiving? We have

to be able to tell the story. Storytelling is very important for archiving otherwise the value of archived assets or the heritage might be weakened and undermined.

Ten years from now, the young generation people will be accustomed to the new media and these people will create new kind of images based upon the new technology. If our generation can contribute to that then technology in art can be fused or combined and we can leave and hand down the better excellent things for the next generation. Thank you very much.

#31

This is an extra slide. Brazil won the World Cup and Sony produced this Bravia 4K for public viewing of the World Cup. This is a bit of PR for Sony. Thank you.

(Kato) Thank you very much. Japan is very proud of its manufacturing business and we always have been making new things made in Japan. Industrial heritage is precisely, I am coming from this fact, yes, it is important to archive, but digital archiving is not the only answer. It is one of the tools to preserve. In the case of active heritage, because they are moving, it is not as simple as to say that we can conserve it, but we have to understand the function. We need to communicate the function of these heritages. 4K therefore is an outstanding tool for us to communicate the function of the heritage.

I thank you for your cooperation. It is only when we have your cooperation that we can successfully conclude this session. I am sure many of you have questions. We have run out of time but maybe we can take some questions. The 4K is not something that you should view from a distance but instead, you should look at a close up and then you will be able to appreciate the beauty of the images.

(Suzuki) Thank you very much. I would like to thank the four speakers and for their very fruitful, meaningful, and insightful talk. Please join me in thanking the four speakers. Thank you very much indeed.

With this, we would like to conclude Session 8. Thank you for your attention.

(Kato) Any question?

(Q1) For the broadcasting professionals, they can do these things because they have good editing machines but with ordinary PCs, it is impossible to edit and even if you were to buy the high end editing devices at stores, it is impossible. You said that it took the professionals 24 hours to do the rendering and you set it before you to go bed and if you go to work, you start the editing. So I sincerely hope that 128 bit, reasonably priced PC will be developed to do the editing.

Earlier there was the image of Opera House and the Steel Tower. I think you used rock climber or someone to take that image. That is old. That is sort of one time shot and it can be taken using radio controlled helicopters, etcetera. Last year in autumn at Kitakyushu expo, we used the remotely controlled helicopter to do the cliff survey. It is no need you spend money on manpower to do such things. If you are going to repair using components, yes, but just taking those images can be done

remotely controlled. Let us try to save our budget.

(Kato) Thank you. If there are no other questions, lastly, I would like to thank all of you.
Dr. Lyn would like to respond.

(Wilson) Thank you. Just in response to your point there. We were tasked with creating a very accurate three dimensional model of the Sydney Opera House and we do use drones and unmanned aerial vehicles in our surveys also, but this would not have given us the required resolution in this case which is why we used the laser scanners on the cantilever rigs.

(Q1) Now even with 4K, you have these very compact cameras, which can be remotely operated.

(Kato) I'm afraid that you do not fully understand the mechanism of laser scanning, but thank you very much.

(Suzuki) Please talk in individual separately.

(Kato) I think many of the people have already left, but I thank you for staying with us to the very end. Thanks for your cooperation. With this, we would like to conclude the International Conference of Industrial Heritage in a great success. I thank the panelists and the audience. Thank you very much for coming over from overseas to participate in the congress. It was a great pleasure. Thank you. With this we would like to end the International Conference of Industrial Heritage, thank you.