NIPPON STEEL

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Titanium Products for Building Construction - Illustrated Brochure -
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NIPPON STEEL



# Titanium Products for Building Construction

- Illustrated Brochure -

**NIPPON STEEL CORPORATION**

## CONTENTS



National Centre for Performing Arts, China (View from Jingshan Park looking over the Forbidden City)

# Overseas Projects

CHINA

**The Bilbao Guggenheim, which opened in 1997 and was designed by the American architect Frank O Gehry, opened the eyes of many architects around the world to the wonders of titanium. Each country is finding a way to make use of this metal.**

The French architect Paul Andreu selected our titanium coil as used in the Titanium Composite Material (TCM) produced by Mitsubishi Chemical Corporation.

## National Centre for Performing Arts

Roofing

Method – Panel (TCM manufactured by Mitsubishi Chemical Corporation.)
Surface – Roll Dull (ND20)
Thickness – 0.3mm
Area – 43,000m$^2$
Architect – Airport De Paris
Contractor – Hong Kong Construction and Others JV
Fabricator – K.G.E.
Date – 2007
**China**



CHINA

Carlos Ott, the Canadian architect, elected to use TCM on this project.

## Hangzhou Grand Theatre

Method – Panel (TCM manufactured by Mitsubishi Chemical Corporation.)
Surface – Roll Dull (ND20)
Thickness – 0.3mm
Area – 10,000m$^2$
Architect – Carlos Ott
Contractor – Longyuan Construction Group
Fabricator – K.G.E.
Date – 2003
**China**

Roofing

# Overseas Projects

## CHINA

In China, the decision to make use of titanium with the National Centre for Performing Arts marked an opportunity for several other public buildings to choose titanium.

### Hefei Lakeside International & Convention Center

Roofing

Method – Panel (TCM manufactured by Mitsubishi Chemical Corporation.)
Surface – Roll Dull (ND20)
Thickness – 0.3mm
Area – 13,000m$^2$
Architect – Shanghai Architectural Research Institute
Contractor – China Geological Engineering Group Company
Fabricator – Zhejiang Southeast Space Frame Shares Engineering
Date – 2011
**China**

## TAIWAN

The Taiwanese architect Lo Hsing Hua chose titanium. It was the first structure in Taiwan to make full use of titanium for its roof.

### Taipei Arena

Roofing

Method – Panel (TCM manufactured by Mitsubishi Chemical Corporation.)
Surface – Roll Dull (ND20)
Thickness – 0.3mm, 0.6mm, 1.5mm
Area – 20,000m$^2$
Architect – Archasia
Contractor – BES Engineering Corp.
Fabricator – Great Construction
Date – 2005
**Taiwan**

# Overseas Projects

## SPAIN

The hotel makes use of the same shade of light-rich brown titanium pioneered by Frank O Gehry. Mr. Gehry has used our brown titanium in four projects to date.

### Hotel Marques de Riscal

Roofing

Method – Panel
Surface – Roll Dull (SD3); Colors: Pink, Gold
Thickness – 1.0mm
Area – 2,400m$^2$
Architect – Frank O Gehry & Associates
Contractor – Ferrovial
Fabricator – Umaran
Date – 2004
**Spain**

## KOREA

Titanium products have been used in Korea since 2000.

### Saemangeum Exhibition Center

Siding / Wall

Method – Panel
Surface – Roll Dull (ND20)
Thickness – 0.4mm
Area – 4,300m$^2$
Architect – KRC
Contractor – SHINSUNG Construction
Fabricator – MIJIE INDUSTRIAL
Date – 2011
**Korea**

# In a Highly Corrosive Environment

TOKYO

**Our peerless corrosion-resistant titanium is able to resist a highly corrosive coastal sea-air environment that can corrode stainless steel and copper.**

Our titanium has been put to use in Tokyo Bay, a highly corrosive environment.

Photo by Satoshi Mishima, Nikkei Business Publications, Inc

## Tokyo Big Site

Siding / Wall

Method – Panel
Surface – Pickling
Thickness – 0.6, 1.5 mm
Area – 16,000m$^2$
Architect -AXS SATOW INC.
Contractor – Hazama Corporation and Others JV
Fabricator – Roof: Gantan Beauty Industry Co., Ltd.
Panel: Yamaki industry Co., Ltd.
Tajima Junzo Ltd.
Date – 1995
**Tokyo**

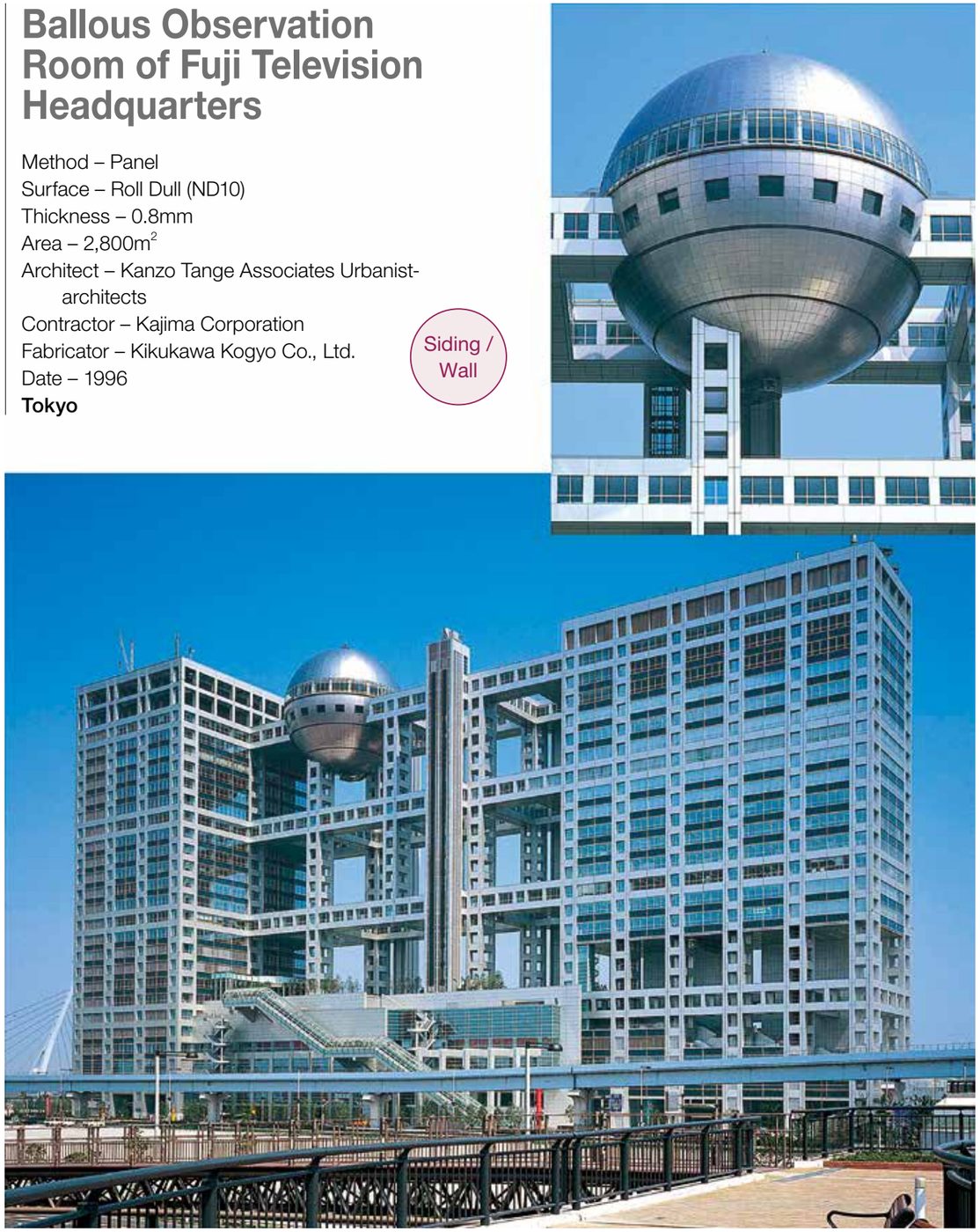


TOKYO

## Ballous Observation Room of Fuji Television Headquarters

Method – Panel
Surface – Roll Dull (ND10)
Thickness – 0.8mm
Area – 2,800m$^2$
Architect – Kanzo Tange Associates Urbanist-architects
Contractor – Kajima Corporation
Fabricator – Kikukawa Kogyo Co., Ltd.
Date – 1996
**Tokyo**

Siding / Wall



# In a Highly Corrosive Environment

More titanium projects have been completed due to the severe corrosive environment alongside the Sea of Japan.

## Shimane Prefectural Art Museum

Method – Flat Roof
Surface – Picking and roll Dull (PD25NX)
Thickness – 0.8, 1.2 mm
Area – 10,000m$^2$
Architect – Kikutake Architects
Contractor – Konoike Construction Co., Ltd and Others JV
Fabricator – Gantan Beauty Industry Co., Ltd.
Date – 1998
**Shimane**

Roofing

SHIMANE

ISHIKAWA

## Uchinada Town Office

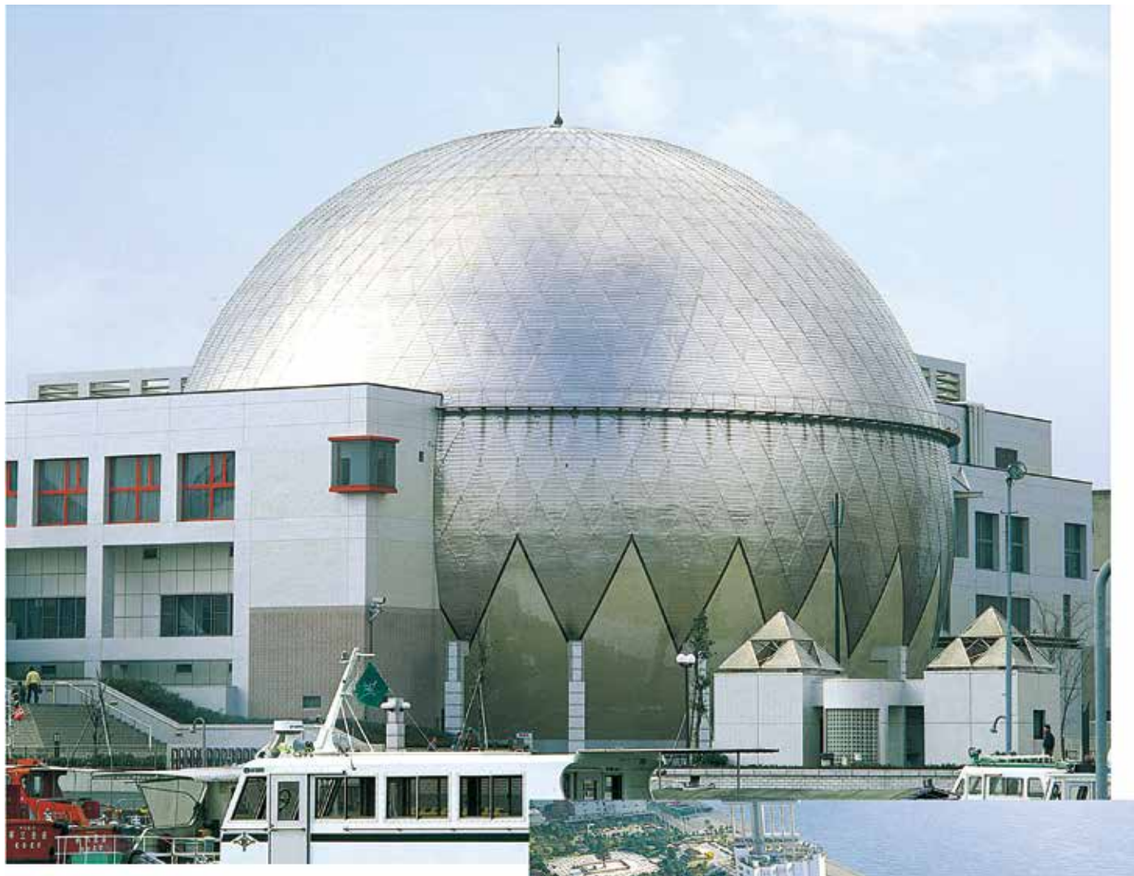
Roofing

Method – Stepped Roofing
Surface – Roll Dull (ND20); Verdigris coloring
Thickness – 0.4mm
Area – 1,700m$^2$
Architect – Goi and Aiesu JV
Contractor – Shimizu Construction Co., Ltd.
Fabricator – Ooyu-kenchikubankin
Date – 1998
**Ishikawa**

# In a Highly Corrosive Environment

AICHI

Titanium is used in the surface of the dome of the seafront-located Aquarium.



## Aquarium Dome in Nagoya Port

Method – Dutch-lap Method
Surface – Roll Dull (ND15)
Thickness – 0.3mm
Area – 2,700m$^2$
Architect – Daiken Sekkei Inc.
Contractor – Kajima Corporation and Taisei Corporation and Others JV
Fabricator – Dohkin Ltd.
Date – 1991
**Aichi**

Roofing

HOKKAIDO

JR Hakodate station, located on the seafront, employs titanium for its sidings and walls

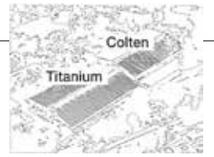
## JR Hakodate Station

Siding / Wall

Method – Panel
Surface – Roll Dull (ND20)
Thickness – 1.0mm
Area – 1,000m$^2$
Architect – Hokkaido Nikken Architects
Contractor – Obayashi Corp.
Fabricator – Sanko Repair / NS Metals
Date – 2003
**Hokkaido**

# Architecture for Centuries

FUKUOKA



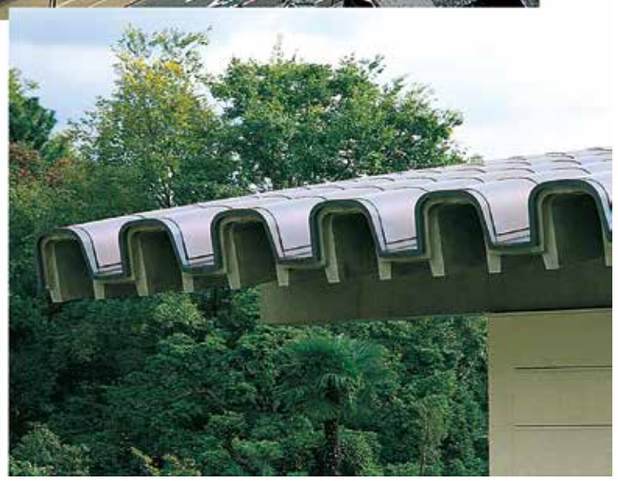

NARA

The Kyushu National Museum and the new annexes of the Tokyo and Nara National Museums have been designed to last one hundred years.

## Kyushu National Museum

Method – Welded Panel
Surface – Roll Dull (ND20); Blue/Coloring
Thickness – 0.4mm
Area – 17,000m$^2$
Architect – Kikutake – Kumei Collaboration
Contractor – Kajima – Hazama and Others JV,
Taisei – Nishimatsu and Others JV
Fabricator – Sanko Metal Industries
Date – 2004
**Fukuoka**

Roofing



## Nara National Museum (No. 2 Annex)

Method – Standing Seam Roofing
Surface – Alumina Blasting (AD03); Brown/Coloring
Thickness – 0.3, 0.4, 1.5mm
Area – 6,000m$^2$
Architect – Junzo Yoshimura Architect
Contractor – Okumura Corporation
Fabricator – Sumitomo Metal Industries, Ltd.
Shinwa Industry
Date – 1998
**Nara**

Roofing

# Architecture for Centuries



## Tokyo National Museum (Heisei Hall)

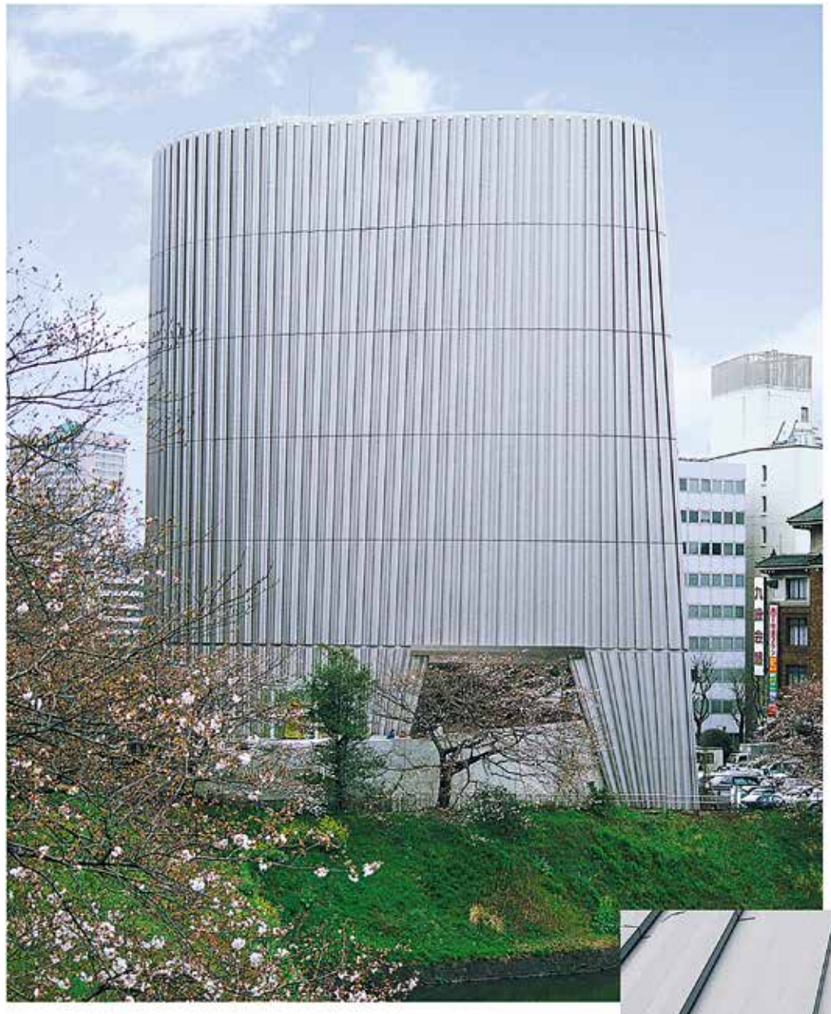
Roofing

Method – Stepped Roofing
Surface – Alumina Blasting (AD03)
Thickness – 0.4mm
Area – 6,000m$^2$
Architect – Yasui Architects and Engineers, Inc.
Contractor – Konoike Construction Co., Ltd. And Others JV
Fabricator – Kobe Steel, Ltd. / Sanko Metal Industrial Co., Ltd. / Gantan Beauty Industry Co., Ltd.
Date – 1998
**Tokyo**





The policy here determined that a shiny surface was not to be used for the metropolitan city center, so this was the first occasion to use an alumina blast finish.



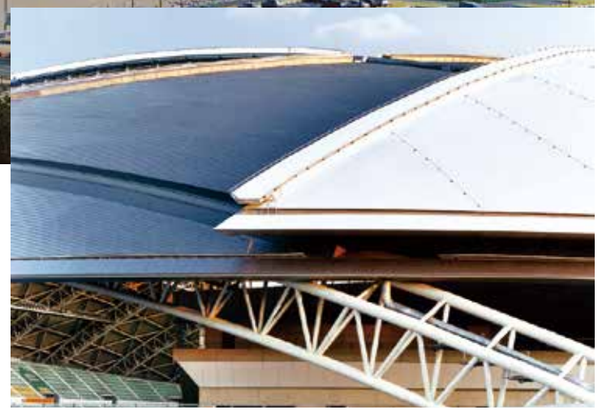
Siding / Wall

## Showa Hall

Method – Panel
Surface – Alumina Blasting (AD09)
Thickness – 1.5mm
Area – 4,200m$^2$
Architect – Kikutake Architects
Contractor – Takenaka Corporation and Others JV
Fabricator – Kikukawa Kogyo Co., Ltd.
Tajima Junzo Ltd.
Nihon Kentetsu Co., Ltd.
Date – 1998
**Tokyo**

# Architecture for Centuries

OITA



Roofing

## Oita Sports Park Stadium

Method – Welded Panel
Surface – Roll Dull (ND20)
Thickness – 0.4mm
Area – 32,000m$^2$
Architect – KT Group
Contractor – KT Group
Fabricator – Shinwa Industries
Date – 2001
**Oita**

KYOTO

## Kyoto University Funai Tetsuro Auditorium & Funai Center

Roofing

Method – Welded Panel, Light Panel
Surface – Roll Dull (ND20)
Thickness – 0.4mm, 1.0mm
Area – 4,000m$^2$
Architect – Nikken Architects
Contractor – Shimizu Corp.
Fabricator – Sanko Metal Industrial Co., Takada / Naito Metals
Date – 2007
**Kyoto**

# Architecture for Centuries

HYOGO

## Amagasaki Shinkin Bank Kaikan

Method – Step Roofing
Surface – Alumina Blasting (AD09)
Thickness – 0.4mm
Area – 800m$^2$
Architect – Kosumi Architects
Contractor – Kajima Construction
Fabricator – Okubo Metal Plate / Chugiken
Date – 2000
**Hyogo**

Roofing

TOCHIGI

## Nasunogahara Museum

Method – Step Roofing
Surface – Alumina Blasting (AD09)
Thickness – 0.4mm
Area – 1,000m$^2$
Architect – Matsuda Hirata
Contractor – Nishimatsu Construction
Fabricator – Sanko Metal Industrial Co.,
Takada / Chugiken
Date – 2003
**Tochigi**

Roofing

# Architecture for Centuries

M I E

## Mie Prefectural College of Nursing

Method – Standing Seam Roofing
Surface – Pickling and Roll Dull (PD25)
Thickness – 0.4, 0.6, 1.5mm
Area – 2,400m$^2$
Architect – Kume Sekkei Co., Ltd.
Contractor – Maeda Corporation and Others JV
Fabricator – Sanko Metal Industrial Co., Ltd.
Date – 1997
**Mie**

Roofing

SHIGA

## Sagawa Art Museum Tea Arbor (Raku Kichizaemon Kan)

Method – Dutch-lap Method
Surface – Alumina Blasting (AD03)
Thickness – 0.3mm
Area – 400m$^2$
Architect – Takenaka Corp.
Contractor – Takenaka Corp.
Fabricator – Tahara Bankin
Date – 2007
**Shiga**

Roofing

# New Age of Traditional Japanese Beauty

GOOD DESIGN AWARD 2003

KYOTO

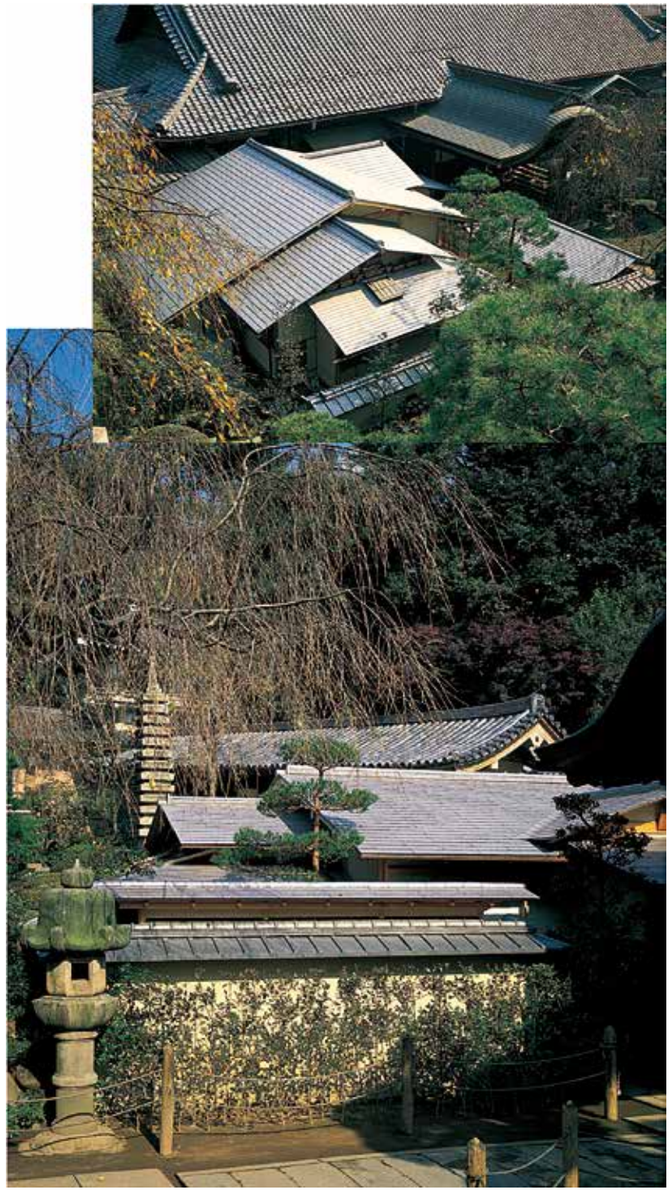
TOKYO

**On the recommendation of Sukiya Kenkyusho, alumina-blasted titanium tiles have been developed to replace the conventional copper, which has a short-lifetime in an acid-rain environment. These titanium tiles, with the appearance of traditional Japanese roof-tiles, are currently being used in many shrines and Buddhist temples.**

## Koetsuji Temple Main Hall

Method – Dutch-lap Method
Surface – Alumina Blasting (AD03)
Thickness – 0.3mm
Area – 700m$^2$
Architect – Sukiya Kenkyusho
Contractor – Sukiya Kenkyosho
Fabricator – Sukiya Kenkyusho
Date – 1997
**Kyoto**

Roofing



## Yakuouin Temple Tea Arbor

Method – Dutch-lap Method
Surface – Alumina Blasting (AD03)
Thickness – 0.3mm
Area – 60m$^2$
Architect – Sukiya Kenkyusho
Contractor – Sukiya Kenkyosho
Fabricator – Sukiya Kenkyusho
Date – 1992
**Tokyo**

Roofing

# New Age of Traditional Japanese Beauty



Roofing

## Kinkakuji Tea Arbor (Josokutei)

Method – Dutch-lap Method
Surface – Alumina Blasting (AD03)
Thickness – 0.3mm
Area – 100m$^2$
Architect – Sukiya Kenkyusho
Contractor – Sukiya Kenkyusho
Fabricator – Sukiya Kenkyusho
Date – 2003
**Kyoto**

KYOTO

## Daitokuji Oubai-in Temple (Jikyu-ken)

Method – Dutch-lap Method
Surface – Alumina Blasting (AD03);
Brown/Coloring
Thickness – 0.3mm
Area – 155m$^2$
Architect – Yamamoto Kogyo
Contractor – Yamamoto Kogyo
Fabricator – Kubo Metal Plate
Date – 2011
**Kyoto**

Roofing

# New Age of Traditional Japanese Beauty



## Sensoji Temple Hozo-mon Gate

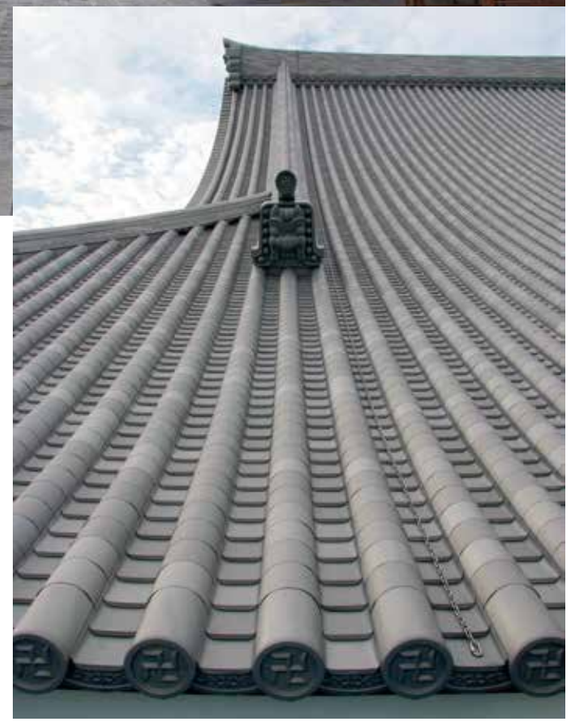
Method – Roof tiling, decorative roof tiles
Surface – Alumina Blasting (AD03, AD06)
Thickness – 0.3mm, 1.0mm
Area – 1,080m$^2$
Architect – Shimizu Corp.
Contractor – Shimizu Corp.
Fabricator – Kaname Inc.
Date – 2007
**Tokyo**

Roofing

- Otani Art Museum Foundation Award 2006
  “Titanium roof tilling and decorative roof tiles”





## Sensoji Temple Main Hall

Method – Roof tiling
Surface – Alumina Blasting (AD03, AD06, etc.)
Thickness – 0.3mm
Area – 3,000m$^2$
Architect – Shimizu Corp.
Contractor – Shimizu Corp.
Fabricator – Kaname Inc.
Date – 2009
**Tokyo**

Roofing

# New Age of Traditional Japanese Beauty

HYOGO

## Hosenji Temple

Method – Flat roof tiling
Surface – Alumina Blasting (AD03)
Thickness – 0.4mm
Area – 334m$^2$
Architect – Kaname Inc.
Contractor – Kaname Inc.
Fabricator – Kaname Inc.
Date – 2009
**Hyogo**

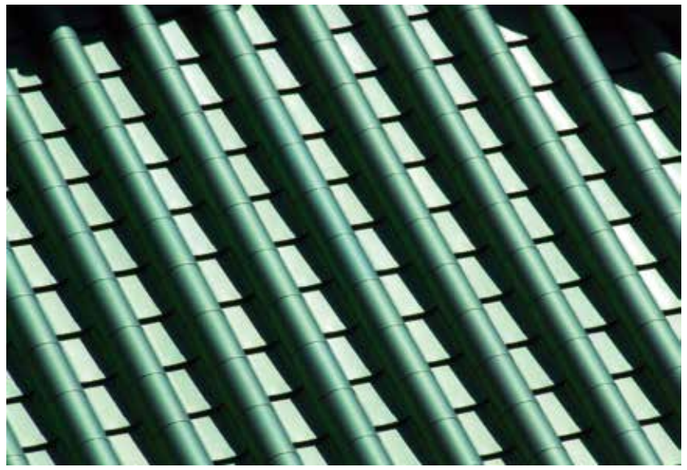
Roofing

SAGA

Roofing

## Ryukotokuji Temple

Method – Roof tiling
Surface – Alumina Blasting (AD09); Verdigris coloring
Thickness – 0.3mm
Area – 2,500m$^2$
Architect – Kojima Kiyoshi Architects Office
Contractor – Teshima Komuten.
Fabricator – Ono Industries, Inc. / Toun Metals
Date – 2009
**Saga**

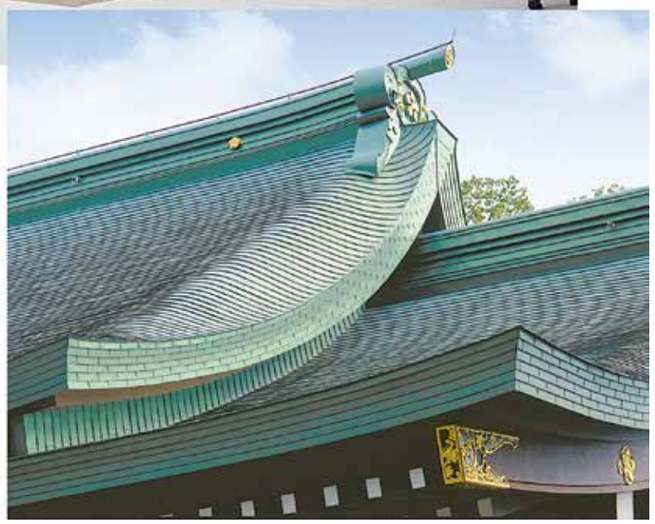


# New Age of Traditional Japanese Beauty

KYOTO

FUKUOKA

A colored surface finish (green, blown) has been applied to alumina-blasted products.



## Kitano-Tenmangu Shrine Treasury

Method – Dutch-lap Method
Surface – Alumina Blasting (AD09);
Verdigris coloring
Thickness – 0.4mm
Area – 1,000m$^2$
Architect – Kyoto Kenchiku Kenkyusho
Contractor – Okutani Construction Co., Ltd.
Fabricator – Ono Industry
Date – 1998
**Kyoto**

Roofing

## Miyajidake Shrine

Method – Dutch-lap Method
Surface – Roll Dull (ND20);
Gold / Coloring
Thickness – 0.3mm
Area – 220m$^2$
Contractor – Kongo-Gumi
Fabricator – Ono Industries, Inc.
Date – 2010
**Fukuoka**

Roofing

# New Age of Traditional Japanese Beauty

TOKYO




## Ikegami Honmonji Temple

Method – Dutch-lap Method
Surface – Roll Dull (ND10)
Thickness – 0.3mm
Area – 400m$^2$
Contractor – Shimizu Kenkyusho
Fabricator – Hidaka Shoji / Kubo Bankin
Date – 2002
**Tokyo**

Roofing

SHIZUOKA

## Daichuji Temple

Roofing

Method – Dutch-lap Method
Surface – Alumina Blasting (AD03)
Thickness – 0.3mm
Area – 661m$^2$
Architect – Katobiken
Contractor – Katobiken
Fabricator – Doryo Bankin
Date – 2006
**Shizuoka**

# New Age of Traditional Japanese Beauty — FUKUOKA

## Ashitaka Shrine

Roofing

Method – Dutch-lap Method
Surface – Alumina Blasting (AD09);
Verdigris coloring
Thickness – 0.3mm
Area – 122m$^2$
Architect – Otsuka Construction
Contractor – Otsuka Construction
Fabricator – Ide Bankin
Date – 2004
**Fukuoka**

## *Civil Engineering (construction/structural)*

**NS Cover Plate is a new technology from NIPPON STEEL ENGINEERING, which together with the TP method (titanium cover petrolatum lining method) from NIPPON STEEL ANTI-CORROSION CO.,LTD. works to prevent bridges and piers from corrosion and contributes to their long working lives. This approach employs a cover coating of titanium with great corrosion resistance and durability.**

## Haneda Airport D Runway Pier

Method – NS Cover Plate
Surface – Anti-Corrosion Cover
Thickness – 0.35mm
Area – 570,000m$^2$
Architect – Kajima Corporation and NIPPON STEEL ENGINEERING and Others JV
Contractor – Kajima Corporation and NIPPON STEEL ENGINEERING and Others JV
Fabricator – Kajima Corporation and NIPPON STEEL ENGINEERING and Others JV
Date – 2011
**Tokyo**

# *Civil Engineering (construction/structural)*

## Port and Airport Research Institute / Hazaki Research Pier

Method – TP Method
Surface – Anti-Corrosion Cover
Thickness – 0.6mm
Architect – NIPPON STEEL ANTI-CORROSION
Fabricator – NIPPON STEEL ANTI-CORROSION
Date – 1997
**Ibaraki**

## Chiba Prefecture / Naganuma Water Bridge

Method – TP Method
Surface – Anti-Corrosion Cover
Thickness – 0.6mm
Architect – Aoi Engineering
Date – 2012
**Chiba**

# Monument

## Flame Holder at the Nagano Winter Olympic Games

Surface – Mirror
Thickness – 2.0, 3.0mm
Architect – Kiyoyuki Kikutake
Sculptor of Interactive Scupltures
Fabricator – Tig
Date – 1998
**Nagano**


## Sculpture Koka

Surface – Mirror
Thickness – 3.0mm
Architect – Minami Tada
Contractor – Sakamoto
Corporation and Others JV
Date – 1994
**Hokkaido**

## Chigasaki Southern C

Surface – Shot Blast
Architect – Kotobuki
Fabricator – Toho Tech
Date – 2002
**Kanagawa**