



Japan-Sri Lanka Urban Development Seminar 2016

"Concerning the disaster resistance infrastructure maintenance"

Daiwa House technology of "Sustainable model earthquake-resistant"

Fujita technology of "Infrastructure construction"

October, 2016

Daiwa House Industry Co., Ltd.

Director and Senior Managing Executive Officer

Keiichi Yoshii

The Daiwa House Group technology of “Sustainable model earthquake-resistant” Fujita technology of “Infrastructure construction”

Direction

■ Group Highlights

- (1) Daiwa House Group Management Summary
- (2) Map of Daiwa House Group's Global Presence

■ Daiwa House Group provides safe and comfortable housing construction technology.

- (1) Japanese prefabricated house that is strong against earthquake - xevoΣ
- (2) The technology of a sustainable model earthquake-resistant, and etc.
- (3) Home storage system / Zero Energy House
- (4) Seismic isolation warehouse

■ Business Overview

- (1) Single-family Houses
- (2) Rental Housing
- (3) Commercial Facilities / Logistics Facilities
- (4) Business and Corporate Facilities
- (5) Condominiums
- (6) Environment and Energy / Existing Home Business
/ Robotics business / Agriculture / Environmental Greening

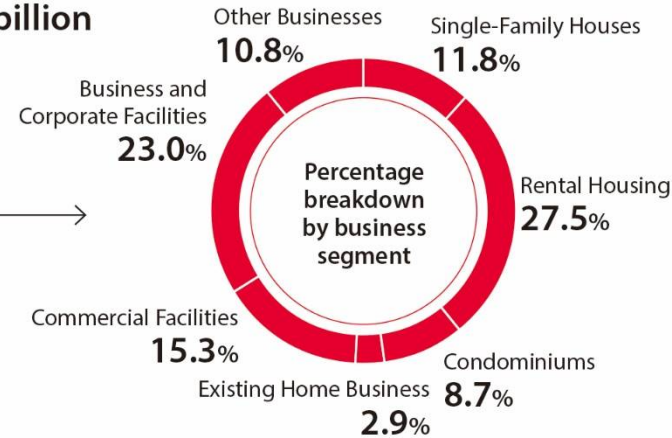
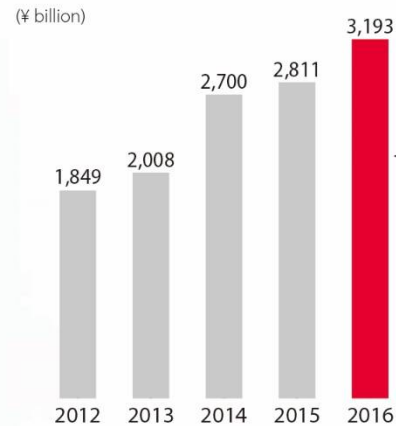
■ Overseas Business

■ Daiwa House Group – Fujita Corporation

■ Possibilities for Business Operation in Sri Lanka

(1) Daiwa House Group Management Summary FY2015

Net sales*1 **¥3,192.9 billion**



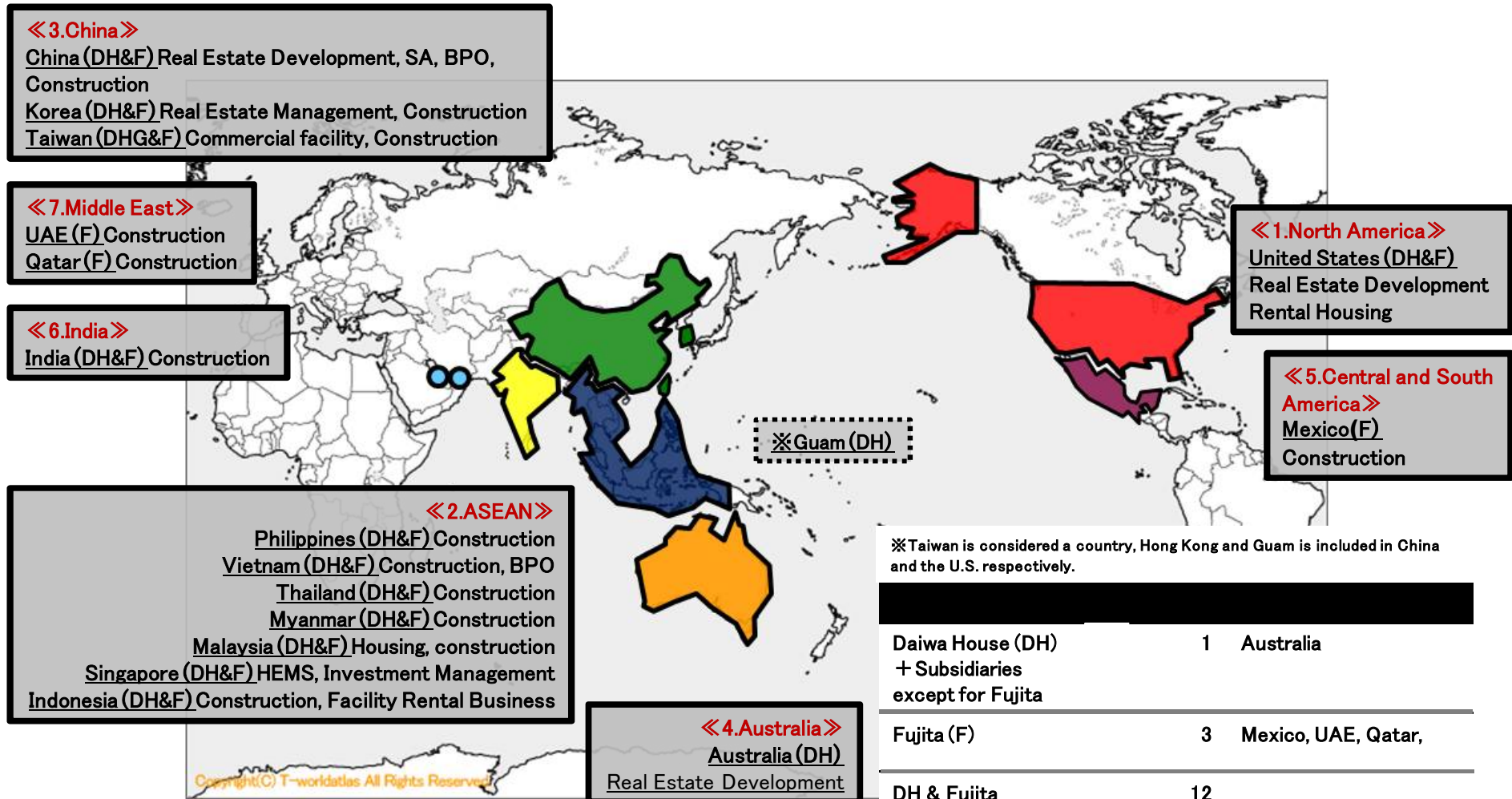
Note: The percentage figures for breakdown of net sales by segment are sales to external customers.

NO.1 sales in the Japanese construction industry.

NO.1 asset holder as a domestic logistics developer in Japan

Developed “the root of the prefabricated house”

(2) Map of Daiwa House Group's Global Presence



Daiwa House (DH) + Subsidiaries except for Fujita	1	Australia
Fujita (F)	3	Mexico, UAE, Qatar,
DH & Fujita	12	
Total	16	

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Daiwa House Group
provides safe and comfortable housing construction technology.

■ Daiwa House Group provides the technology of housing construction.

(1) Japanese prefabricated house that is strong against earthquake - xevoΣ

■ The Great Earthquake on the 17th January 1995

An intensity of 7 / Magnitude 7.3

249180 houses were completely and partially destroyed.

× 4 times



●Reference: Kobe city: The Great Hanshin earthquake “The memory of 1.17”

■ Daiwa House Group provides the technology of housing construction.

(1) Japanese prefabricated house that is strong against earthquake - xevoΣ



Japanese prefabricated house

A “Prefabricated house” means
to make house beforehand in a factory,
and also called “the modular house”.



A strong house despite repeating earthquakes

●Reference: Kobe city: The Great Hanshin earthquake “The memory of 1.17”

■ Daiwa House Group provides the technology of housing construction.

(1) Japanese prefabricated house that is strong against earthquake - xevoΣ

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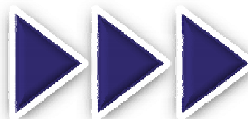
× 4 times

Japanese prefabricated house “xevo”

Making a product at the factory



Assembling it on the site



- It can efficiently supply material which are managed under certain conditions.
- Field work is reduced, and a large shortening of work can be realized.
- High quality construction can be conducted without being influenced by the skill of the workman.
- In the case of a detached house, the construction process until the substrate materials of the second-floor roof can be finished in few days from the foundation level. It minimizes the influence of weather as much as possible.

- The Daiwa House Group provides the technology of safety and security
- (2) The technology of sustainable model earthquake-resistant”

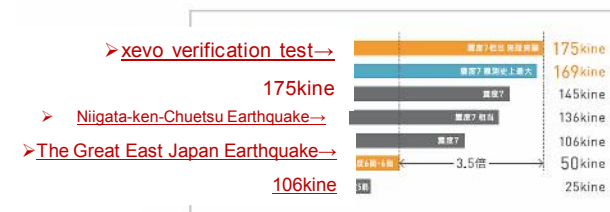
The verification of strength.



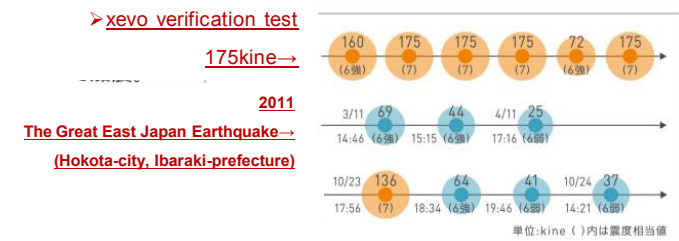
The Daiwa house carried out a large-scale vibration experiment at the “E-Defense” (nickname), which is one of the world’s largest full scale three-dimension vibration destructive experiment facilities.

Experiment

A huge stock of 175kine (seismic intensity of 7 equivalency), more than any earthquake waves recorded in history.

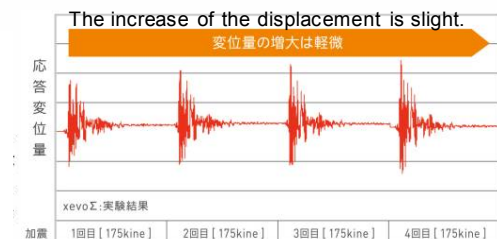


We assume a repeated main shock and aftershock of consecutively 4times in 175kine (seismic intensity of 7 equivalency)



Verification test

Even if the xevoΣ undergoes a seismic intensity of 7 equivalency four times consecutively, we have verified that it maintains an earthquake-resistant performance equivalent to that of a new house.



■ The Daiwa House Group provides the technology of safety and security
(2) The technology of sustainable model earthquake-resistant”

It move with flexibility.

Energy absorbing model bearing wall “D-NΣQST”



The “Σ model device”, which moves with flexibility absorbs the earthquake’s energy efficiency.

It prevents the damage of structure body which absorbs repeating earthquake energy for the seismic intensity of class 7.

Three features of “D-NΣQST”

Earthquake-resistant

It prepares the ground for the seismic intensity of class 7.

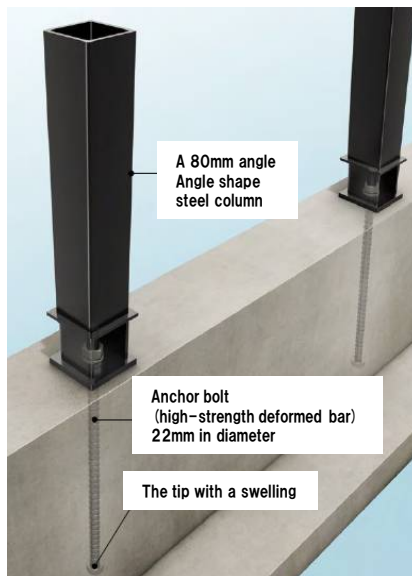
Absorption

The effective work of the “Σ model device” makes the shaking of the building converge at an early stage.

Sustainability

It maintains high earthquake-resistant performance.

A 80mm angle / Angle shape steel column



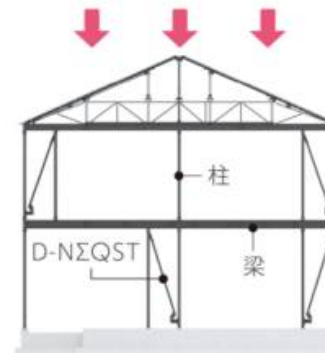
The cross sectional structure with a good balance.

Anchor bolt

Strongly connects the building and the foundation together.

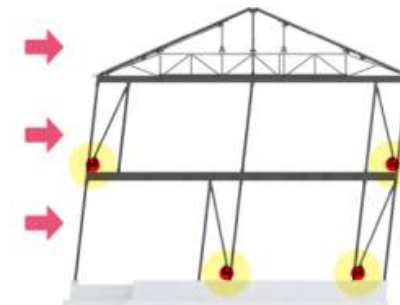
Sustainable model Earthquake-resistant structure

Vertical power caused by the building and loading weight.



The column and beam supports it.

Horizontal power caused by an earthquake and typhoon.



The bearing wall “D-NΣQST” takes it and then the “Σ model device” absorbs it.

■ The Daiwa House Group provides the technology of safety and security
(3) Home storage battery system / Zero Energy House

Home storage battery system

The effective use of electricity ;
To provide in the case of emergency

Lithium-ion batteries are higher in efficiency than lead-acid batteries and nickel-metal hydride storage batteries and while taking advantage of its efficiency, they can be used for a long time.

Capacity: 6.2kWh



Zero Energy House (Image)

means that the annual primary energy consumption is net zero or a negative house.

■ High heat insulating house in the outer shell



■ The energy saving facilities with high efficiency



■ Renewable energy



- The Daiwa House Group provides the technology of safety and security
- ## (4) Seismic isolation warehouse

We keep on relieving.

This intensity that can undergo an earthquake of the seismic intensity of 7,

D-Project Ariake



Overview:

- Site area: 36,309.00 m²
- Building area: 19,525.97 m² (Performance evaluation applied.)
- Total floor area: 112,402.21 m² (Performance evaluation applied)
- Base floor area: 18,783.77 m² (2~5th floor)
- Number of stories: 6 stories and tower building
- Floor height: 6.25m at 6 floor / 6.66m at 1st to 5th floor

Daiwa House Group Business Overview

Business overview

(1) Single-family Houses



● Built-to-order Houses

We offer residential comfort and guaranteed safety with our cutting-edge steel frame and wooden structure homes

Driven by the evolution of our proprietary technologies, we have achieved constant growth in our core business of single-family houses. We have added popular models to our lineup in anticipation of the needs of each successive generation, including the steel-frame xevo— whose high-level seismic absorption capabilities allow it to withstand repeated massive earthquakes – and the xevo Granwood, in which we use only high-quality Japanese timber. We now sell all our single-family house products under the SMAEco smart house brand, with home energy management systems (HEMS) and photovoltaic power generation systems included as standard. In these ways, we are creating a truly eco-friendly next-generation residential environment.

	2014	2015	2016(予)
Number of houses sold	49,859	52,103	53,355
Single-family housing	7,280	6,999	7,010
Housing Subdivision	2,614	2,333	2,340
Rental Housing	36,757	38,903	41,000
Condominiums	3,208	3,868	3,005

● Housing Subdivision

Developing communities where people can come together, feel at ease, and be happy

Taking fully into account the interaction that people need with the natural environment, as well as the requirements of safety, Daiwa House develops communities where residents can live comfortably. These developments feature bright, open townscapes affording attractive green vistas, where people can mingle easily with one another – communities that warm the hearts of both residents and visitors. To help realize a low-carbon society, we are creating energy self-sufficient communities under our SMAxECO PROJECT, and hope to popularize people-friendly, eco-friendly town planning concepts that will open the way to a better future.

■ Business overview (2) Rental Housing



● Rental Housing

Value-added rental housing to help pass on assets to the next generation

For landowners seeking more effective utilization of their properties, we provide a comprehensive service covering everything from site assessment through planning, design, and construction to management support. To meet tenants' needs – which are becoming more diverse with each generation – we offer a full lineup of products with new forms of added value, including apartments featuring home security systems, residential facilities for seniors, two-family apartments, and shared apartments for singles. In our rental housing business, we help landowners pass on their precious assets to the next generation, and contribute to the well-being of regional communities by providing high-quality housing.

		2013	2014	2015
Daiwa Living Daiwa Living Management	Management of rental housing units	376,760	418,382	452,401
	Occupancy rates	97.2%	97.6%	97.5%
Nihon Jyutaku Ryutu	Management of rental housing units	15,018	17,133	18,941
	Occupancy rates	95.8%	94.9%	95.3%
Total	Management of rental housing units	391,778	435,515	471,342
	Lump-sum contracted unites (occupancy guarantee)	352,341	397,282	433,628
	Occupancy Rates	97.2%	97.5%	97.4%

(3) Commercial Facilities / Logistics Facilities



● Retail and Wholesale Facilities/ Commercial Facilities

Leveraging extensive land-use data and ability in planning and proposals to support our customers' most effective business development



● Logistics Facilities

Deriving optimal solutions from observation of front-line logistics operations

In the logistics facilities business, we employ our D-Project proprietary business format, under which we meet all our customers' diverse needs from selection of prime-location sites through the design and construction of facilities, to service operation and building management. In addition to BTS (build-to-suit) logistics facilities for particular tenants, we also construct multi-tenant facilities in prime locations, and both categories of facility are proving popular in the market. Daiwa House has been engaged in logistics facility development right from its founding. We aim to constantly derive advanced solutions from our close observation of actual practice in the front line, to become the logistics facility supplier of choice.



● Offices and Factories

Strengthening relationships with corporate clients to offer comprehensive solution

In our offices and factories business, we utilize our extensive database on land prices and sites available for development to make land-use proposals covering everything from initial surveys through planning, design, and construction to post-completion maintenance. We offer land-use proposals for sites of every scale, and for buildings and other facilities for all kinds of purposes, across the whole of Japan. We leverage the Group's ability to make comprehensive proposals incorporating solutions that meet all our clients' needs, and these have proved very popular in the market. They include proposals for eco-friendly offices and factories, for the building of new corporate facilities or relocation of existing ones, and for the rebuilding or demolition of existing properties.

● Medical and Nursing Care Facilities

Comprehensive support services from planning through financing to operation

In 1989, anticipating the rapidly developing phenomenon of population aging in Japan, we established the Silver Age Research Center to investigate issues involved in the construction and operation of medical and nursing care facilities. The Center meets customers' wide-ranging needs by leveraging its specialist know-how to select suitable sites, draw up projects, and consult with governmental bodies. We have developed leading-edge medical facilities under the name of "D's SMART MEDICAL," which has been designed to meet the projected medical facility management needs of the next generation. This system incorporates environment-friendly and earthquake-mitigation technologies that ensure the safety and comfort of patients and staff, in addition to business management support.

(5) Business and Corporate Facilities



● Condominiums

Meeting the needs of different generations and regions with unique, high value-added condominiums

To provide residences with the levels of safety, security, and all-round livability that our customers are looking for, we offer condominiums matching the particular characteristics of each area of Japan that will maintain their asset value over any years. In our urban renewal projects, we have recently introduced the concept of “area anagement” – under which the management and development of a neighborhood is principally entrusted to the residents themselves – and have also been developing condominiums targeted mainly at “active seniors,” where residents can continue to live with an easy mind despite their age. In such ways, we develop and market high value-added condominiums that constitute the sort of solid social capital that meets the needs of different generations and regions.

		2013	2014	2015
Daiwa LifeNext New	Number of managed unites	84,819	87,520	259,017
	Number of managed buildings entrusted by HOAs	1,337	1,404	4,047
Daiwa LifeNext Former	Number of managed unites	147,487	152,729	
	Number of managed buildings entrusted by HOAs	2,439	2,510	
Global Community	Number of managed unites	77,024	80,239	83,282
	Number of managed buildings entrusted by HOAs	1,758	1,843	1,882
Total	Number of managed unites	309,330	320,488	332,299
	Number of managed buildings entrusted by HOAs	5,534	5,757	5,929



Business overview

(6) Environmental energy / Existing Home Business / Robotics Business / Agriculture / Environmental Greening



DREAM Solar Wakayamashi (Wakayama)



Robot Suit HAL® is a registered trademark of CYBERDYNE Inc. Mentally committing robot is a registered trademark of the National Institute of Advanced Industrial Science and Technology. PARO is a registered trademark of Intelligent System Co., Ltd. POPO is a registered trademark of Moritoh Corporation. Minelet is a registered trademark of NWIC Co., Ltd. COMUOON is a registered trademark of UNIVERSAL SOUND DESIGN Inc. HUMANY is a registered trademark of Unicharm Corporation.

Daiwa House Group Overseas business

1. North America/ United States



We announced the project overview of our “Chicago North Clark Project”, a high-rise rental housing project in Chicago, Illinois. The 31-story, approx.100 m high luxury rental housing project is the 3rd joint project with Lincoln property company.



In March 2016, the project outline has been finalized for Cooper Street, a rental housing development project in the suburbs area of Boston, MA. The rental property will offer various resident amenities with a total of 264 units.



2. China

Housing Development Project and Sales of Industrializing Houses


Grace Residence	
Location	Changzhou
Completion	2015
Site area	74,480m ²
Total floor area	186,200m ²
Total units	1,178 units
Types	Condominiums, Retail, Serviced Apartments

Moonlit Garden	
Location	Wuxi
Completion	2014
Site area	81,751m ²
Total floor area	156,503m ²
Total units	436 units
Types	Town houses, condominium s

Grace Residence*Soldout	
Location	Suzhou
Completion	October, 2011
Land area/ Gloss floor area	76,572sqm/ 122,501sqm
Total units/ types	902 units/ condominium

Yihe Xinghai	
Location	Dalian
Completion	(Phase 1) September 2012 (Phase 2) 2016 -Planned
Total site area/ Total floor area	156,440sqm / 521,400 sqm
Total units / Types	2,121 units / Condos, Retail, Serviced Apartments

Construction and Sales of Industrialized Housing Parts



Location	Shaoxing, Zhejiang
Completion	Baoye Group

2006: Project launch
2010: Construction of the model house
2011: Obtained Certificate of Recognition of Technology Achievement in the Construction Industry
2013: Establishment of 'Baoye Daiwa Industrialized House Manufacturing company limited.'

Representative Office

- Changzhou-Wuxi: Approx. 65km
- Wuxi-Suzhou: Approx. 50 km
- Suzhou-Shanghai: Approx. 120 km
- Shaoxing-Shanghai: Approx. 200km

3. ASEAN

Indonesia / Vietnam

[Daiwa Manunggal Industrial Park (MM2100)]

- Total Area / 1450ha
- Collaboration with Manunggal group
(PT Bekasi Fajar Industrial Estate, Tbk) ("BEST")
- BFIE / Tikaran Java, Bekasi (30km from Jakarta CBD)
- Building rights title (HGB) /
Right to construct building on the land on a piece of land that someone else owns.
(30 years + 20 years + 30 years, a maximum of 80 years)



Port Tanjung priok
Soekarno Hatta Airport



- The closest Japanese-affiliated industrial park to Jakarta.
- Direct connection to Cibitung I.C. of highway.

[Development Plan Summary of Long Duc Industrial Park]

- Total development area / 270 hectares (Available area: 200ha)



[Summary of Mid Town Project]

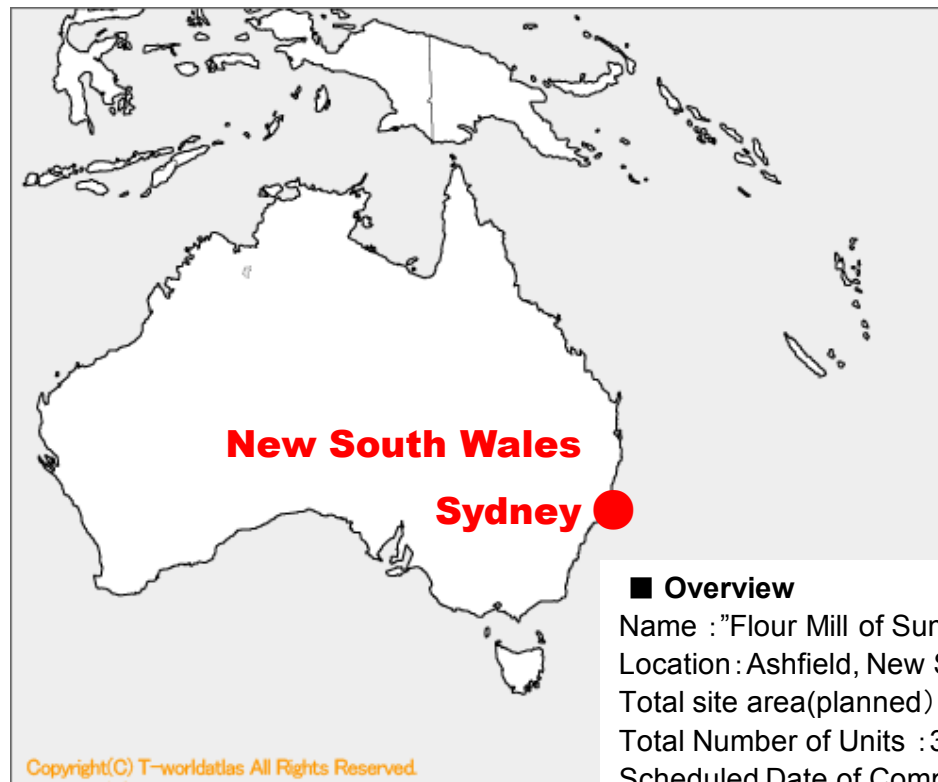
- District 7, Phu My Hung, Ho Chi Minh City
- Joint development business between Phu My Hung / Nomura Real Estate / Sumitomo Forestry
- Number of units / 2,100 units (planned)
- Phase 1 : 1,100 units (Land area: 28,000sqm / Gross floor area: 180,000sqm)
- Start of construction and sales (Phase 1) / Q1 2017 (planned)



4. Australia

Flower Mill of Summer Hill Project

➤As the first joint development with EG Funds Management, we announced the development of a condominium and a retail facility at a site managed by the EG Funds Management and formerly used as a flour mill. This is our second real estate development in Australia.



■ Overview

Name : "Flour Mill of Summer Hill Project"
Location : Ashfield, New South Wales, Australia
Total site area(planned) : 24,789sqm / Total salable floor area : 35,000sqm
Total Number of Units : 300units
Scheduled Date of Completion : Mid-2016

Sources: Daiwa House Website and Press release



Conceptual drawing
(View from the North-West side)



Conceptual drawing
(View from the North-East side)



Conceptual drawing

Daiwa House Group Fujita Corporation

Creating the future, together

In October 2015, Daiwa Odakyu Construction Co., Ltd. and Fujita Corporation - both companies with over 100 years of history - merged to form a single company. We intend to make our customers' dreams come true in more ways - by combining the experience and abilities of both companies with the traditions we have developed as members of the Daiwa House Group as we construct our future.

Main Business Interests

Building Construction,
Civil Engineering,
Real Estate Development

Representative

President and CEO **Yoji Okumura**

Founded

Dec.1910

Reorganized

Oct.2002

Head Office

4-25-2 Sendagaya, Shibuya-Ku, Tokyo
Japan

Employees

2,856 (As of April 1,2016)

Capital

JP Yen 14 billion (USD 0.14billion)

Revenue

JP Yen 310 billion (USD 3.1 billion)

Civil engineering technology

We build infrastructure using safe and reliable technology developed over many years.

Construction technology

We help our customers grow their businesses through advanced engineering that includes skyscraper construction technology and earthquake-proofing technology.

Environmental technology

We put great effort into environmental conservation and restoration through unparalleled technological strength.

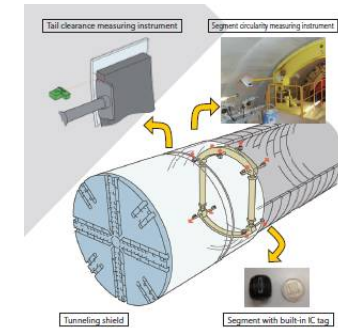
We want more precise tunnel boring.

Real-time measuring of segment assembly precision

Fujita high-quality tunneling shields We want more precise tunnel boring.

High-quality construction management is possible by digging tunnels with a tunneling shield (tunnel boring machine) and assembling cylindrical tunnel segments (tunnel construction components) one-by-one behind it.

- The circularity of segments can be automatically measured in real-time.
- Non-uniform tail clearance (the gap between the walls of the bore hole and the outer surface of the tunnel segments) can be avoided.
- The displacement of tunnel segments continues to be measured even after assembly in order to produce a high-precision primary lining.



We want to build bridges and multilevel roadways in a safe and economical manner.

Raising work platforms using robotic jacks

The FCF method

Winner of the Prize for Excellence at the 5th Infrastructure Technology Development awards in 2003

This system uses multiple robotic jacks to raise work platforms that include integrated scaffolding and forms. Because it can be assembled and disassembled on the ground, it is very safe and economical.

- Control devices and sensors allow the work platform to remain level while being raised.
- This technique combines the advantages of the form construction method and the sliding form method.
- The FCF method combined with aluminum dome roofing allows the installation of safer work platforms with fewer constraints for constructing dome roofs.



Track record in Highway works

Fujita can undertake any kind of Highway Projects:

Viaducts / Tunnels / Bridge / Junction

HIGHWAY Project



**Koshirazu Tunnel
(NIIGATA JAPAN)**



**Koshirazu Tunnel
(NIIGATA JAPAN)**



**Fujigawa Bridge
(SHIZUOKA JAPAN)**



**Yokkaichi Junction
(MIE JAPAN)**



**Kurezaka Tunnel
(KOCHI JAPAN)**



**Kobe Kita Junction
(HYOGO JAPAN)**



**Ooyamazaki Highway
(KYOTO JAPAN)**



**Kawaminami Highway
(MIYAZAKI JAPAN)**

Track record in Railway works

Fujita can undertake any kind of Mass Transportation Projects:

Viaducts/Tunnels/Depots/Stations

And

Track work (Ballasted Track and Slab Track)

RAILWAY PROJECTS (Viaducts, Tunnels, Depots, Stations)



LRT Line2 Depot (Philippines)



MTR Tin Shui Wai Station (Hong Kong)



Kyushu High Speed Rail Kagami Bridge Kyusyu (Japan)



Hokuriku High Speed Rail Depot (Japan)



HSST Fujigaoka Station for Tobu Kyuryo Line (Japan)



Tohoku High Speed Rail Kindaichi Tunnel (Japan)

TRACK WORKS



Project: Manila MRT3
Location: Manila, Philippines
Length: L=5.000m X 2 way



Project: Manila LRT Line1
Location: Manila, Philippines
Length: L=2,700m Turn Out 18 nos.

Track record in Airport works

Fujita can undertake any kind of Airport Projects:

Terminal / Tunnels / Box Calvert / Apron

Terminal Project



**Chubu International Airport
(AICHI JAPAN)**



**Hong Kong International Airport
(Hong Kong)**



**Viru Viru International Airport
Runway (Bolivia)**



**Hong Kong International Airport
Box Calvert (Hong Kong)**



**Hong Kong International Airport
Terminal 2, SKY PLAZA
(Hong Kong)**

Track record in Construction works

Fujita can undertake any kind of Construction Projects:

Hospitals / Logistics / Housing / Office / Other



Osaka Gyomeikan Hospital
(OSAKA JAPAN)



Prologis Park Zama 2
(KANAGAWA JAPAN)



HSB Tower (China)



The Japanese School in Seoul
(SEOUL, SOUTH KOREA)



Asakusa Tower
(TOKYO JAPAN)



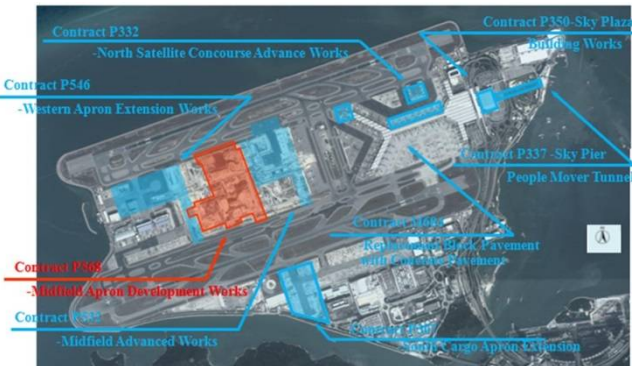
AER Office
(MIYAGI JAPAN)



Wakayama JA Building
(WAKAYAMA JAPAN)

Ongoing Major Project (Overseas)

Fujita can undertake any kind of Infrastructure Projects:



Hong Kong International Airport Apron

KVMRT (Main Line) Track Work
(Kuala Lumpur, MALAYSIA)

Doha Metro Depot (Doha, QATAR)

“Seeing is Believing”

Please come and visit our facility in Japan.



**The Central Research Laboratory
(Nara JAPAN)**



**The Fujita Technology Center
(Kanagawa JAPAN)**

‘Increasing of logistics demand’, ‘To ensure and improve stable housing for people’, and “To strengthen transportation infrastructure” due to **economic growth in Sri Lanka.**

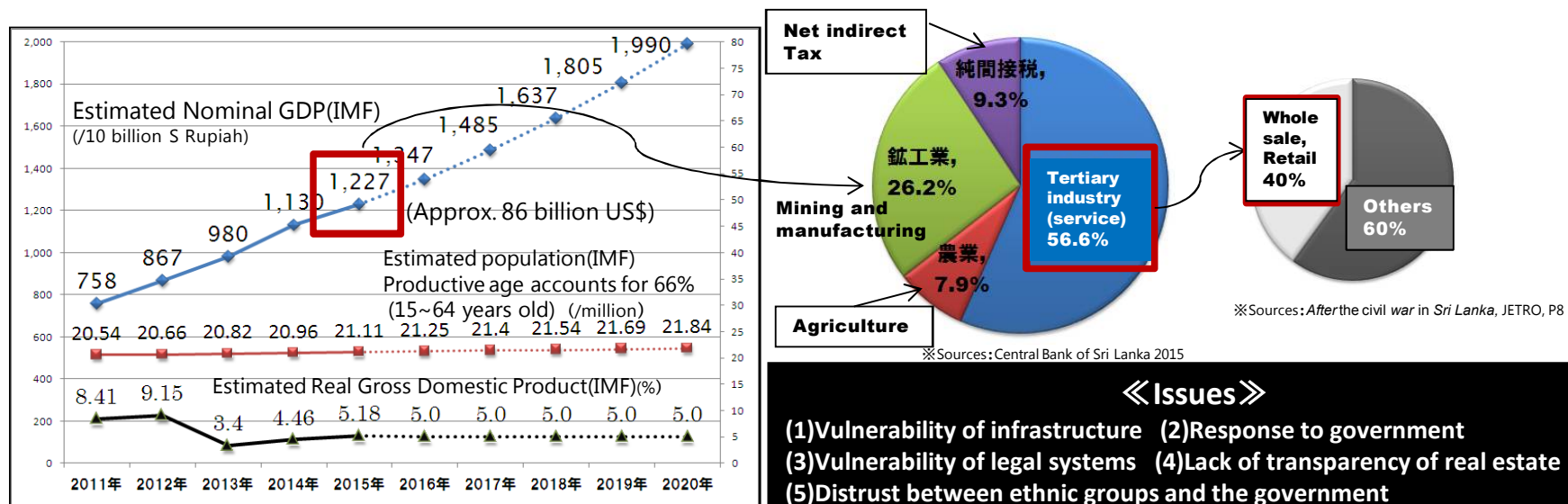
《Key words of business opportunities in Sri Lanka》

[1] Tertiary industry accounts for approx. 60% in GDP. (Wholesale and retail account for approx. 40% out of tertiary industry.)

“Increasing of Logistics demand” ⇒ Proposals for “Logistics know-how.”

[2] Continuation of economic growth “To ensure and improve stable housing for people”
⇒ To provide the technology for housing construction.

[3] The promotion of infrastructure investment is expected.
“To strengthen transportation infrastructure” ⇒ To contribute for road and railway works.



※Demographic dividend in Sri Lanka: 1995~2025※@1US\$/142.52 S Rupiah

- ### 《Issues》
- (1) Vulnerability of infrastructure
 - (2) Response to government
 - (3) Vulnerability of legal systems
 - (4) Lack of transparency of real estate
 - (5) Distrust between ethnic groups and the government
 - (6) Reduce the dependency on China



Daiwa House®
Daiwa House Group

Thank you.

www.daiwahouse.co.jp