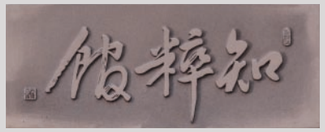

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構造計画研究所
KOZO KEIKAKU ENGINEERING Inc.

Asagaya Project

Chisuikan 知粋館





KOZO KEIKAKU ENGINEERING Inc.

The WORLD'S FIRST 3-D seismic isolator system

Rubber bearing Horizontal wave 1/8

Air spring Vertical wave 1/3

*Compared with typical seismic resistant buildings.

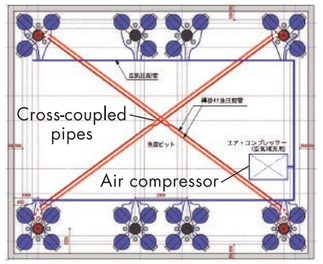
Device alignment

3D seismic base isolators are placed under each pillars.

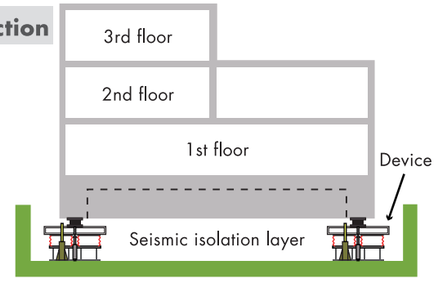
Isolators in the four corners are equipped with oil dampers that are connected by cross-coupled pipes to reduce rocking motion.

Each air springs are connected with compressor to keep pressure at the normal level.

Plan



Section

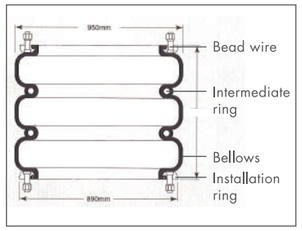


Laminated rubber bearing
(Reducing horizontal seismic motion)

The bearing consists of multi-layered steel plate and rubber. In the event of earthquake, the system deforms horizontally, absorbing horizontal seismic wave.

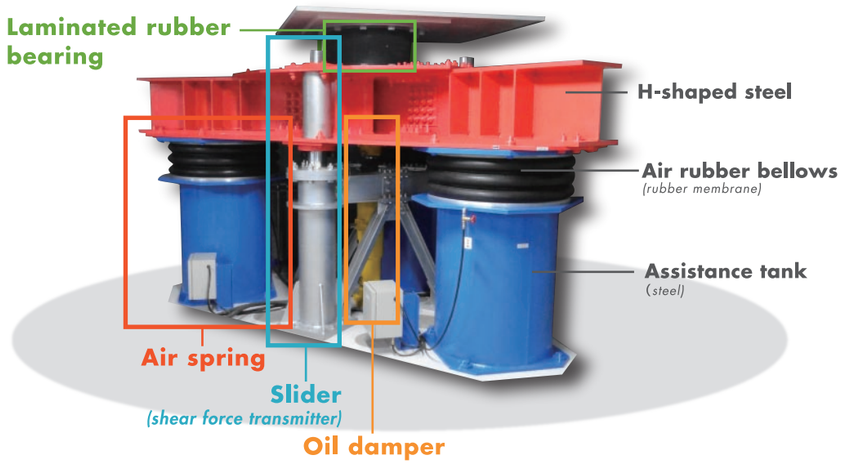
Air spring
(Reducing vertical motion)

Bellows air springs, typically used for heavy vehicles such as trailers, and assistance tank made of steel are installed in this isolator to leverage elasticity of the air to reduce vertical seismic wave.



Section diagram of bellows rubber

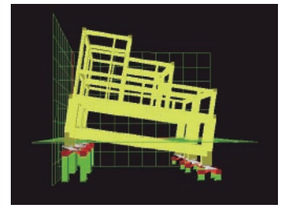
3D seismic base isolator
(Hyper air suspention)



HYPER AIR SUSPENTION was co-developed with Shimizu Corporation and Kayaba System Machinery Co.,Ltd. under the mentorship of Mr. Takafumi Fujita, a professor emeritus at the University of Tokyo.

Oil damper
(Suppressing rocking motion)

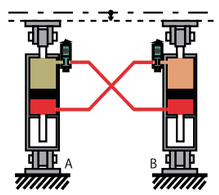
*Rocking motion:A rotational vibration such as the behavior of rocking chair.



Rocking motion occurs when each pillar jiggles up and down freely.

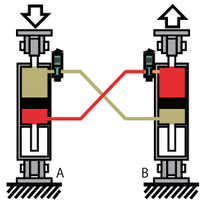
Best to avoid rocking motion in order to secure habitability and safety.

Vertical motion



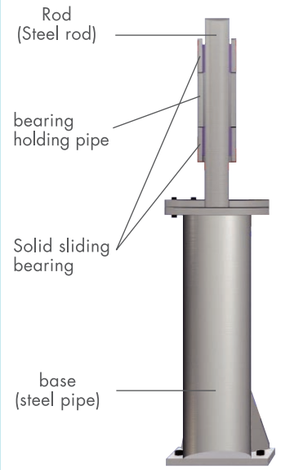
Vertical energy will be absorbed by appropriate damping of pipe resistance.

Rocking motion



Rocking motion will be controlled by the excessive damping of damper valve control.

Slider
(shear force transmitter)



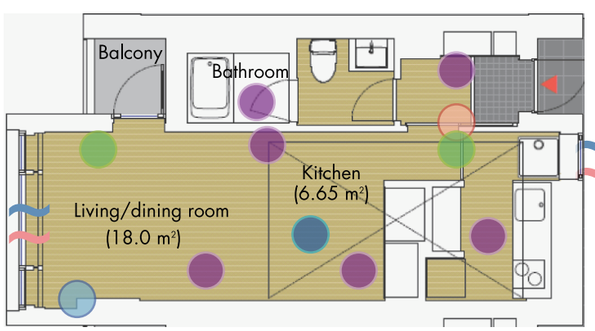
Monitoring systems of "CHISUIKAN"

Environment/Energy monitoring

Temperature, humidity, illuminance and utilities usage, etc., are monitored and utilized to validate targeted building performances and energy efficiency.

- **Evaluating building performances**
- **Capturing the lifestyle & energy consumption pattern**
- **Optimizing overall energy consumption**

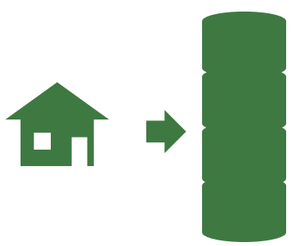
- Electricity consumption measurement by gauges attached to outlet. (for TV, fridge, washer, etc.)
- **Electricity** consumption measurement by distribution boards. (for rooms)
- **Gas/water** consumption measurement by gas/water meters.



- **Temperature/humidity/** illuminance measurement (TV, refrigerator, etc.)
- **Visualizing** monitored data on indoor displays, PC, and TV.
- **Actual seismic movements** are monitored at multiple points to validate performance of 3D seismic isolators and dampers.

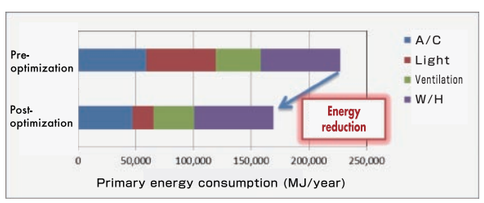
Optimized energy consumption ~for smarter energy usage~

Input utility costs → **Calculate consumed energy** → **Optimize energy consumption**



Overall energy consumption

Categorized energy consumption



CHI
知

WISDOM
- A source of KKE's creativity

SUI
粋

PROMINENT
- A craftman spirit that has been passed down from the establishment

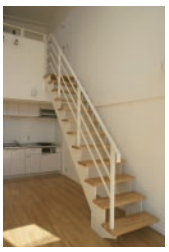
KAN
館

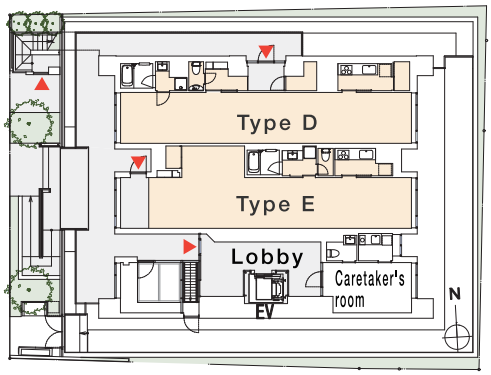
RESIDENCE
- A residential building that assures safety and comfort.

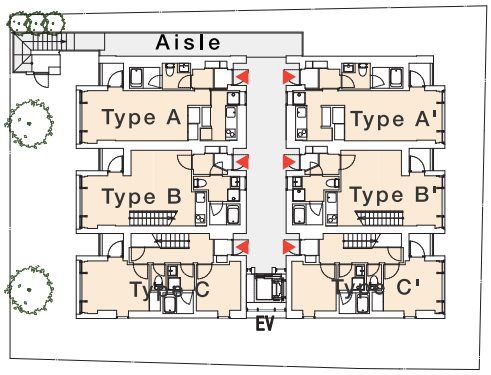
知粋館
"Chisuikan"

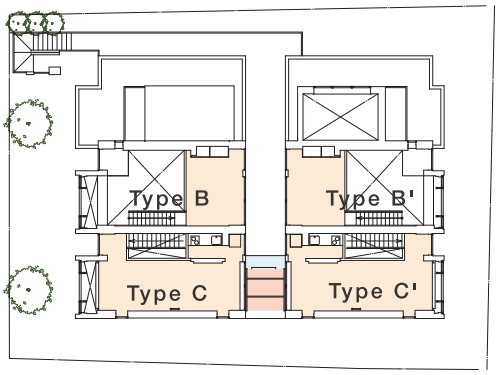
"CHISUIKAN" is a building that is installed with the world's first 3D seismic isolation devices and other state-off-art technologies of KKE.











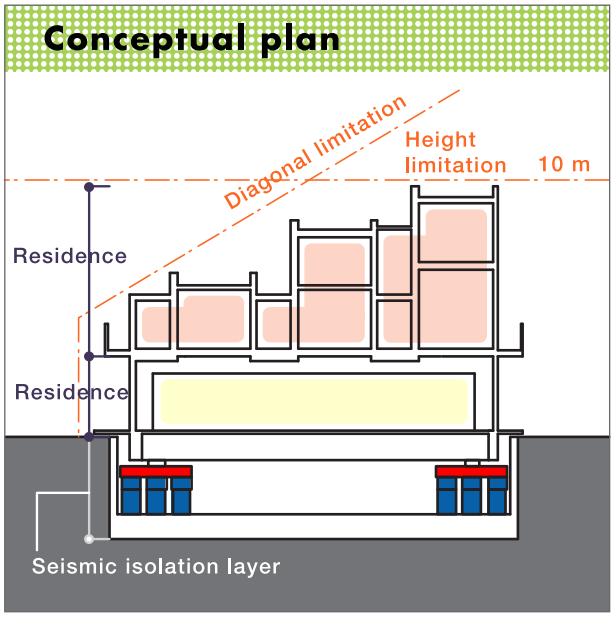
Description of Chisuikan

Location	: Asagaya-minami, Nakano-ku, Tokyo, Japan
Usage	: Appartment house
Site area	: 469.18 square meters
Building area	: 259.94 square meters
Floor space	: 548.78 square meters
Number of stories	: Three
Height	: 9.00 meters
Structure	: Reinforced concrete (Base isolation)

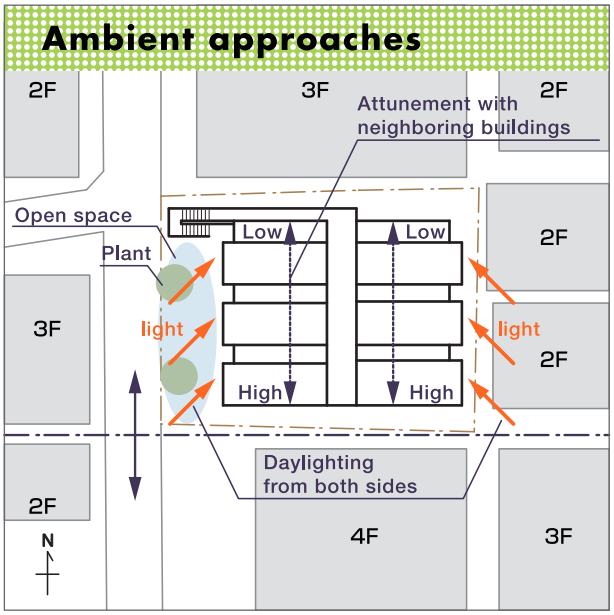
Design	: Eiichi Sugiura Architect & Associates
Structural design	: Kozo Keikaku Engineering Inc. Shimizu Corporation
Facilities design	: Akeno Fire Research Institute
Construction	: Shimizu Corporation
Evaluation committee	: The Building Center of Japan (Structural evaluation・building certification・residence performance evaluation)

Concept of Chisuikan design

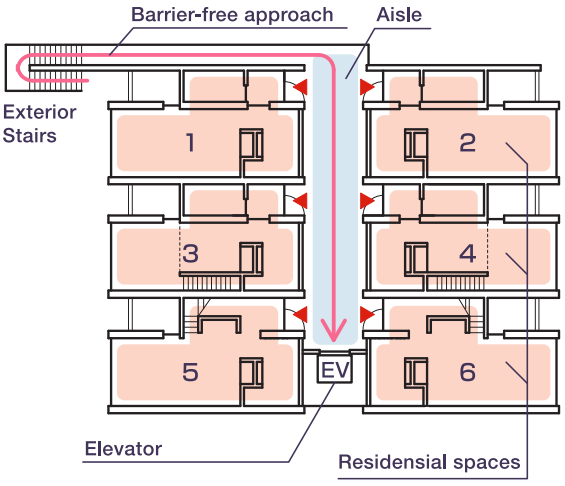
1 Conceptual plan



2 Ambient approaches



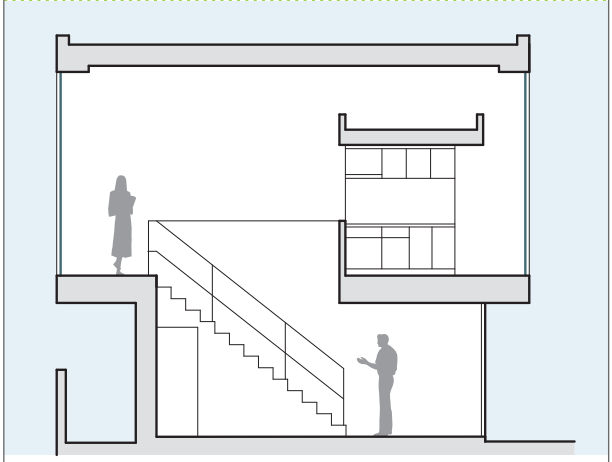
3 Barrier-free & User friendly



4 Sustainability

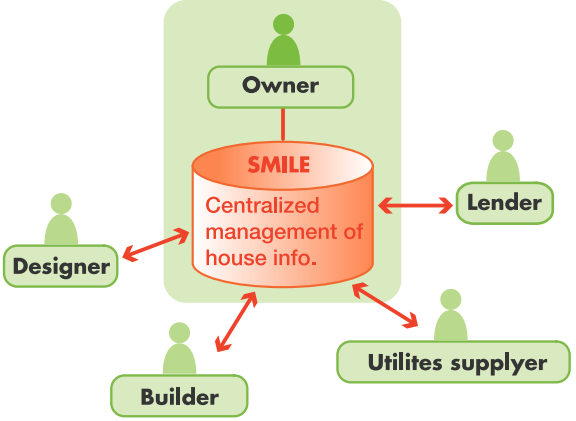
- Durable building frame
- Seismic-resistent
- Easy maintenance & supervision
- Flexible layouts for various occasions
- Energy monitoring & saving
- Barrier-free access
- Harmonization w/ambient environment

5 Habitability



Multiple residence types & room layouts

6 Storing house history (SMILE ASP)



SMILE ASP stores any information related to the house as centralized data, enabling all parties involved to make the best use of it.