

ANNUAL MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE ON HISTORIC CITIES, TOWNS AND VILLAGES
(CIVVIH) – ICOMOS

3RD CONFERENCE OF THE SUB-COMMITTEE FOR CENTRAL AND EASTERN EUROPE

Disaster prevention in historical districts in Japan (earthquakes and fires)

Yuichi Fukukawa

STRATEGIES FOR ENHANCING HISTORIC CITIES' RESILIENCE TO DISASTERS

SEPTEMBER 10-15, 2025
KULDIGA, LATVIA

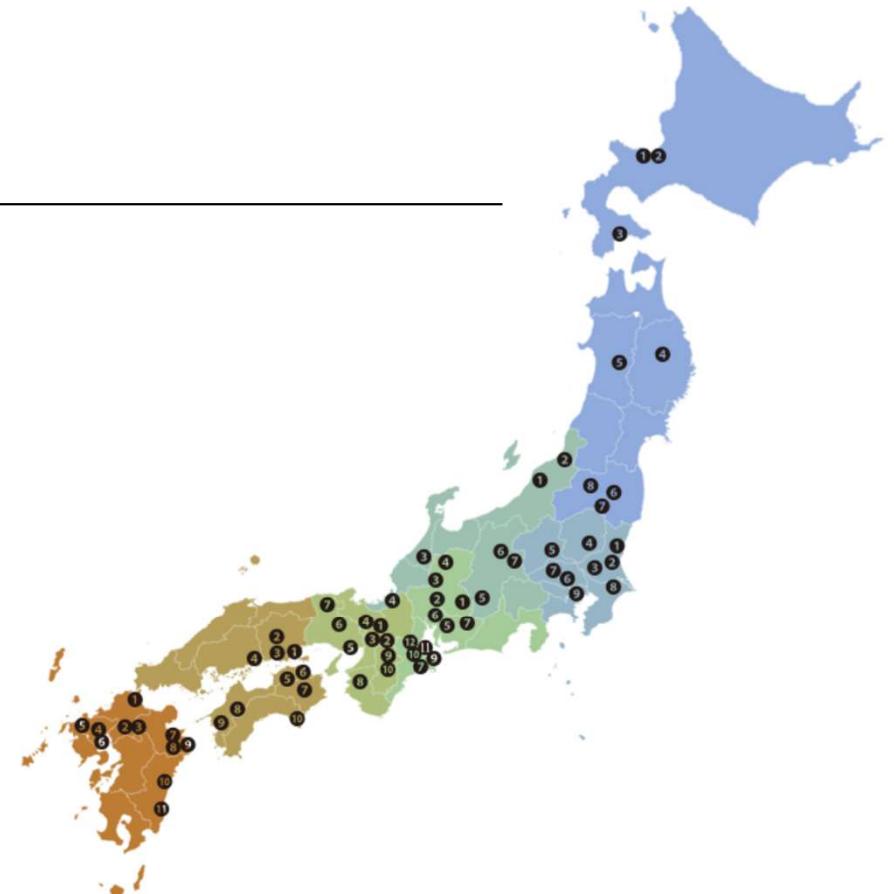


CIVVIH
ICOMOS



Striving for Resilience

At last year's annual general meeting, the Japanese Association for MACHINAMI Conservation discussed disaster prevention under the theme "Striving for Resilience."



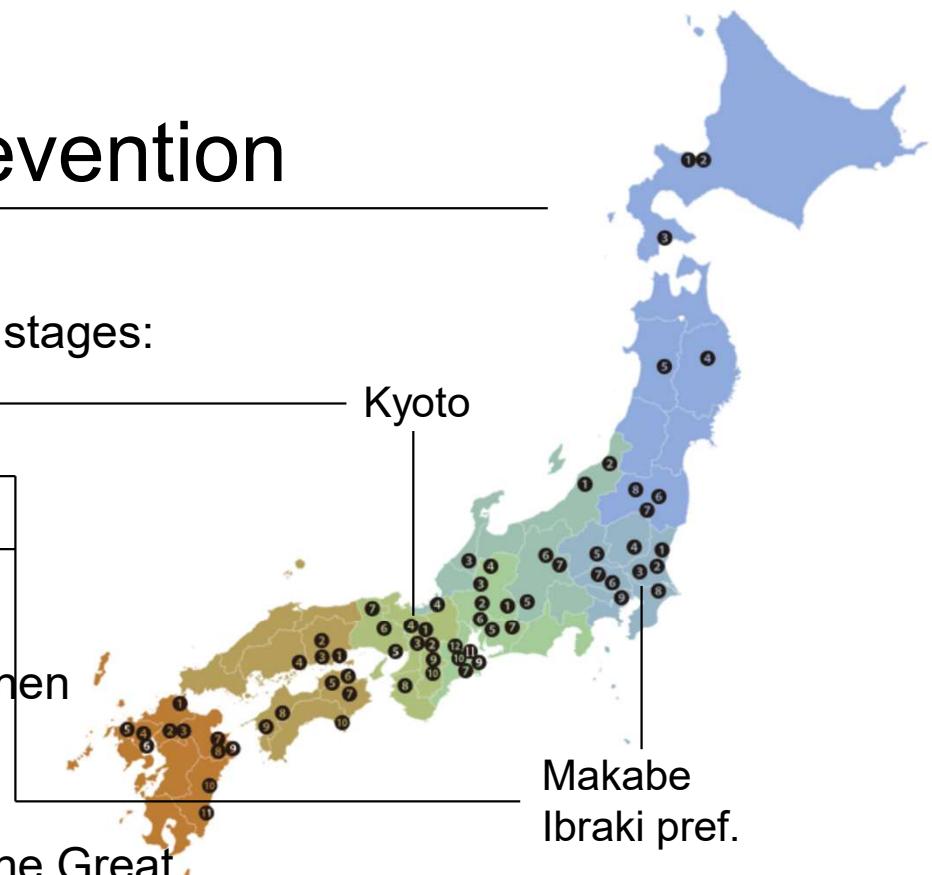
The Japanese Association for MACHINAMI Conservation:
A national organization of civic groups active in historic districts, and last year marked the 50th anniversary of its founding

Three Stages for Disaster Prevention

Disaster prevention measures are divided into three stages:

- before the disaster
- when the disaster occurs
- post-disaster recovery

- Kyoto:
how to implement disaster prevention measures when
restoring a historic quarter
- Makabe:
a small town in Ibaraki pref. that was damaged in the Great
East Japan Earthquake (2011) and has since recovered
- At each stage, the challenge is to prevent the loss of
historical buildings due to disaster prevention or damage



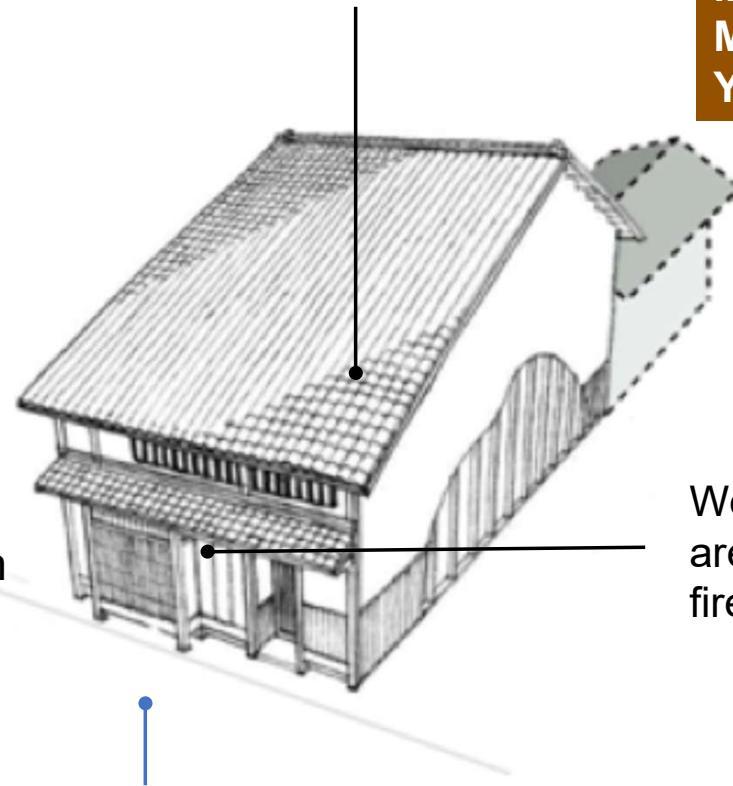
Before a Disaster Occurs

Improving buildings' earthquake and fire resistance and ensuring evacuation in the event of a disaster are essential. However, historic buildings and districts present unique challenges

- Japan's Building Standards Act requires the following for all buildings in urban areas:
 - 1) earthquake resistance
 - 2) fire resistance
- 3) Obligation to access roads: the site must have at least 2m of access to a road at least 4m wide
- Japan's historic cities are made up of wooden buildings called *machiya*. *Machiya* have difficulty meeting the requirements

Seismic resistance is uncertain

Machi-ya
Machi=town
Ya=house



Wooden facades are susceptible to fire spread

The roads in front of these buildings are often less than 4 meters wide.

Before a Disaster Occurs

These regulations can be relaxed in important preservation districts. However,

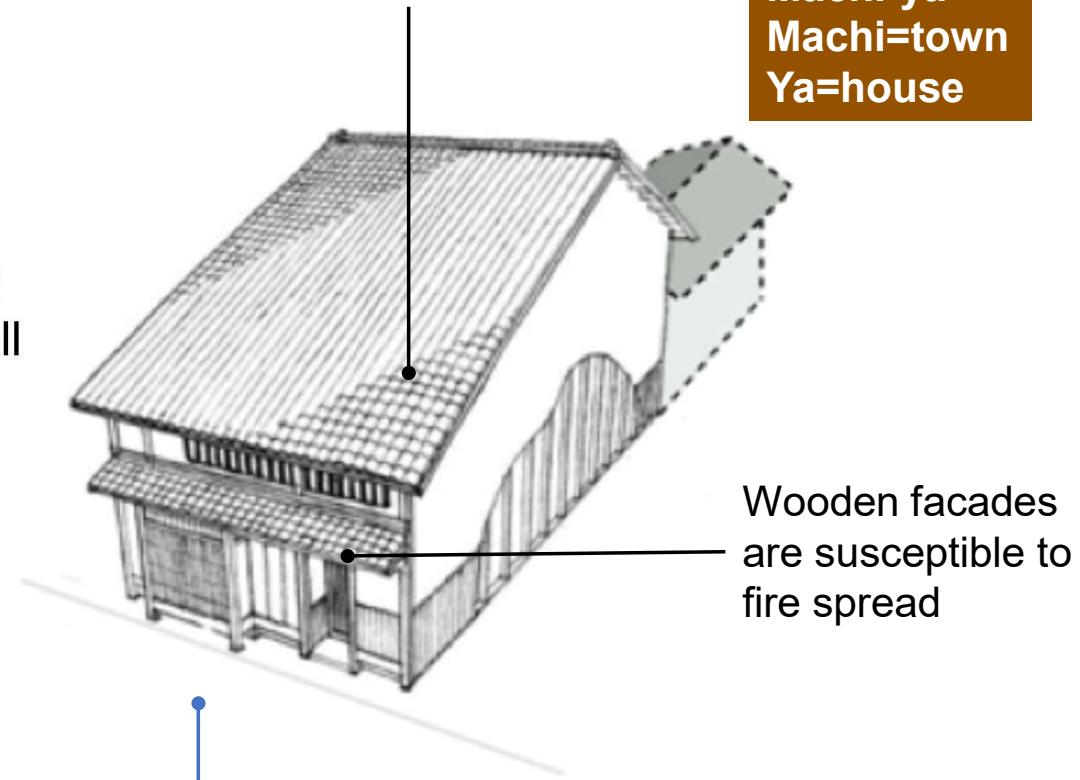
- Earthquake resistance must be ensured regardless of the system.
- Important preservation districts* are limited in number and size, and account for only a small portion of historic urban areas.

*Important preservation district:

A preservation district selected by the national government under the Cultural Properties Protection Act. Its official name is “an Important Preservation District for Groups of Historic Buildings”.

Seismic resistance is uncertain

Machi-ya
Machi=town
Ya=house

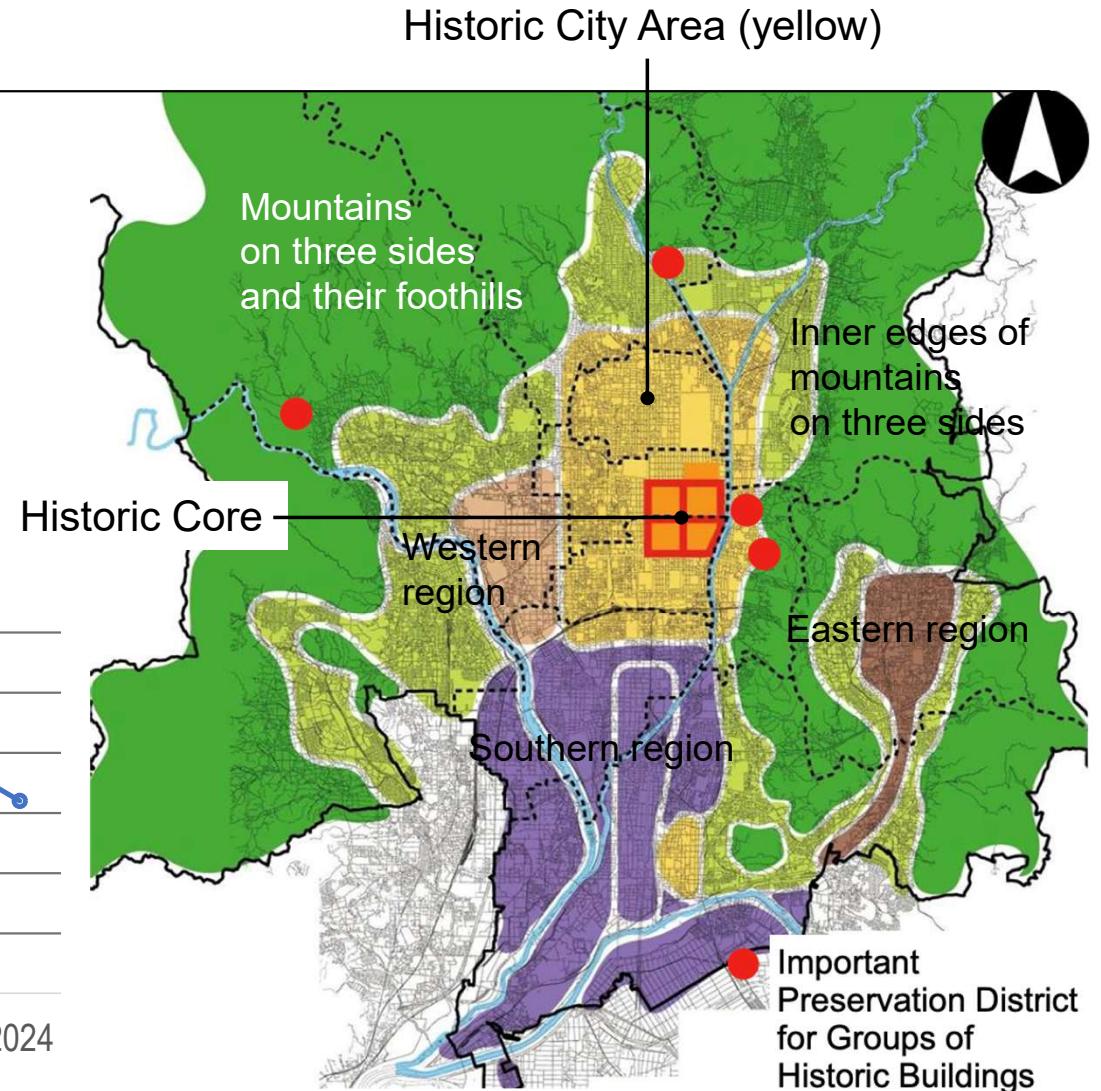
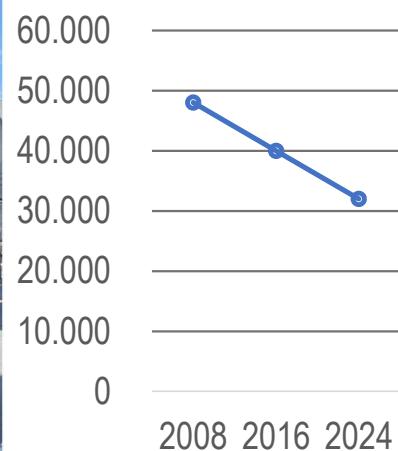


The roads in front of these buildings are often less than 4 meters wide.

The Case of Kyoto

Kyoto has only four Important Preservation Districts (●). However, there are 32,000 traditional Japanese townhouses (machiya) within the city.

- Kyoto's machiya are called “Kyo-machiya”. Their numbers are rapidly decreasing.



“What you can do in a Kyo-machiya”

Introduction to the exemption system of the Building Standards Act and what you can do under the Act

京町家できること集

— 建築基準法の適用除外制度の紹介と建築基準法の下できること —

【令和3年改訂版】



京都市

Wooden exterior walls can be constructed legally.

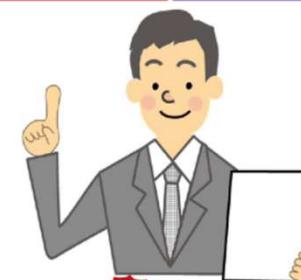
A2 外観の整備は適法にできます！

①壁

⇒適法に外観の整備ができます。
○モルタル仕上げから土壁に変更
⇒ 上記の外観の整備は防火構造の仕様とすることが可能です。
詳細は「このような外観の整備ができます！」(P15)を御覧ください。

②軒裏

⇒適法に外観の整備ができます。
○モルタル仕上げから垂木を表した軒裏に変更
⇒ 上記の外観の整備は防火構造の仕様とすることが可能です。
詳細は「このような外観の整備ができます！」(P15)を御覧ください。



③建具

⇒適法に外観の整備ができます。
○認定仕様の木製防火雨戸を設置する
○告示仕様の防火設備に木材を張る
⇒上記の外観の整備を行っても防火設備として支障ありません。
詳細は「このような外観の整備ができます！」(P16, 17)を御覧ください。

※ 防火設備には、法令に規定された寸法等で作成されたもの(告示仕様)と、それと同等の性能があると個別に認定されたもの(認定仕様)があります。

④木製格子

⇒適法に外観の整備ができます。
○防火設備の外側に格子を設置する
⇒上記の外観の整備を行っても防火設備として支障ありません。
詳細は「このような外観の整備ができます！」(P17)を御覧ください。

14

...A2①②このような外観の整備ができます！...



外観の整備前



外観の整備後

道路側の外観の整備工事を行ったとしても、外壁の面積の半分以下であれば、建築基準法の適用を受けることなく外観の整備ができます。



外観の整備前(モルタル外壁)

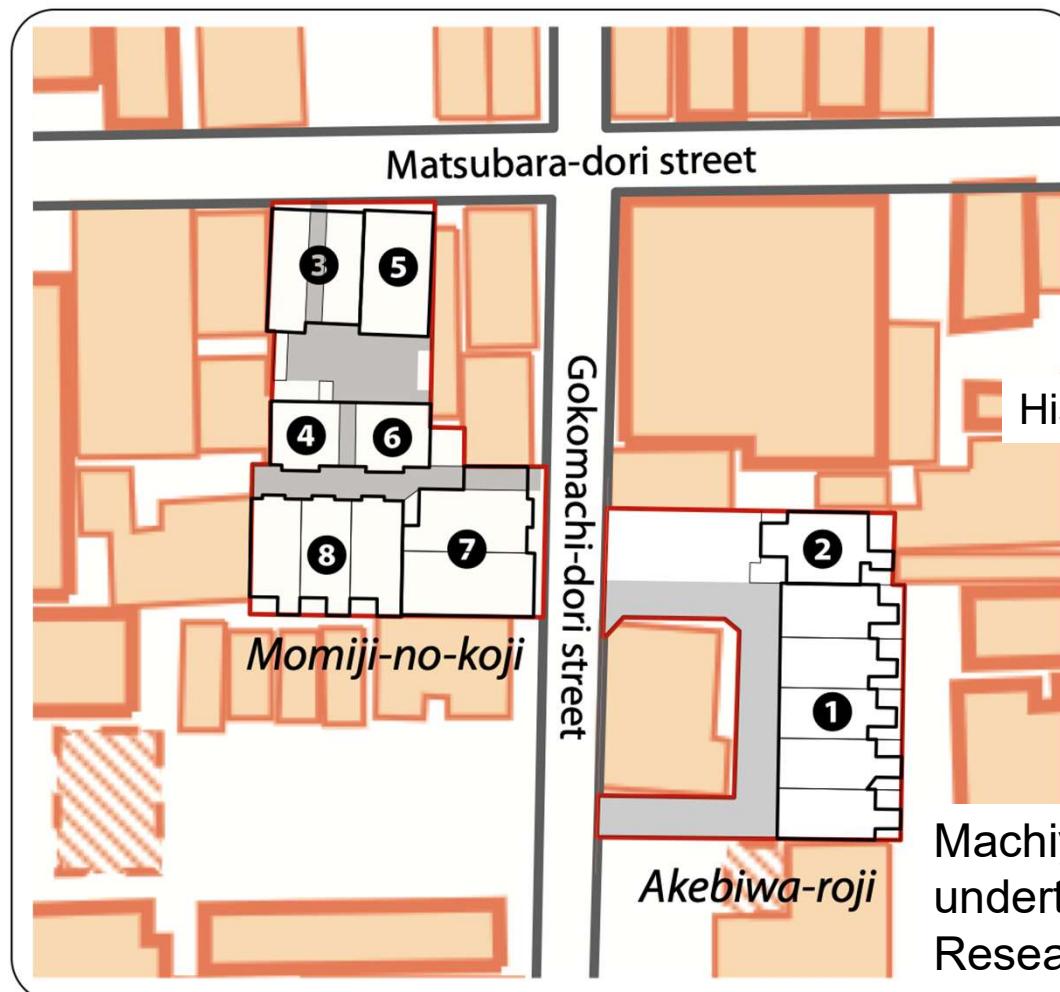


外観の整備後(土壁)

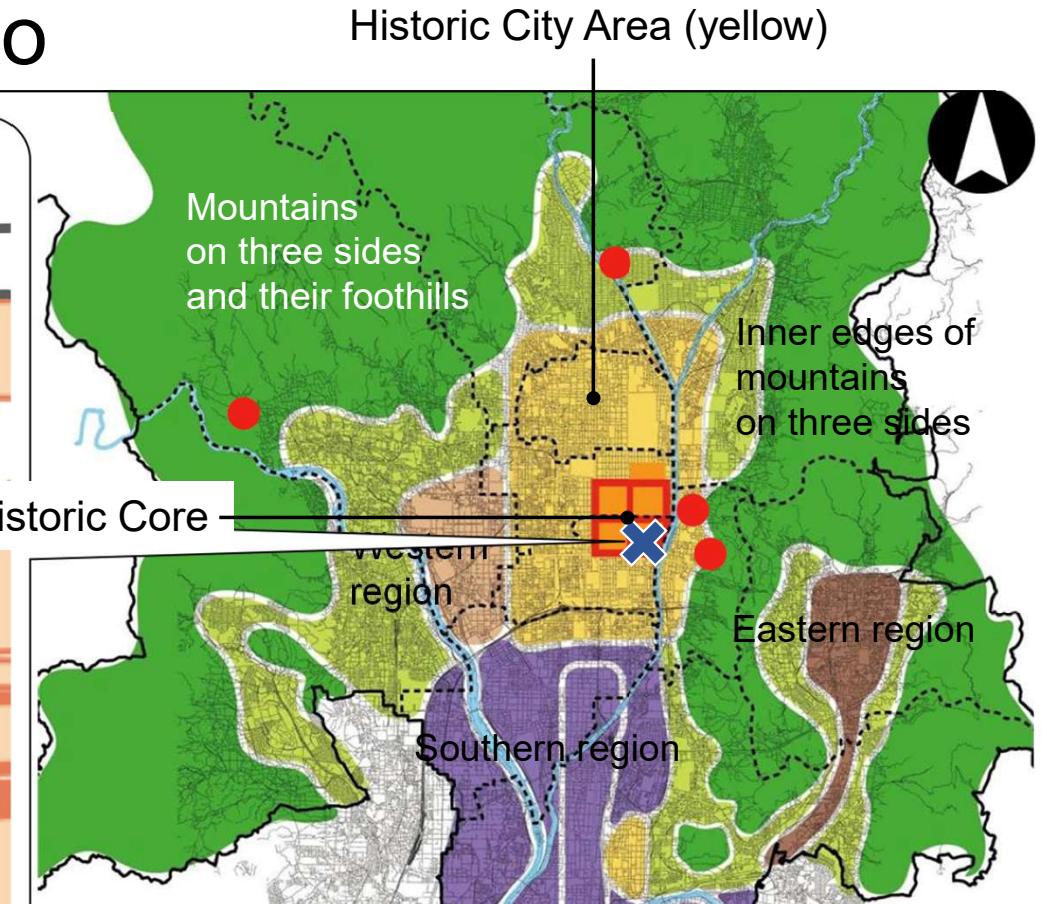
京町家等の意匠を活かした土塗壁、軒裏の防火構造の仕様があります。土塗壁、軒裏は国土交通省の告示に定める仕様や、大臣認定を受けた仕様とすることにより、京町家等の意匠を活かした防火構造とすることが可能です。

15

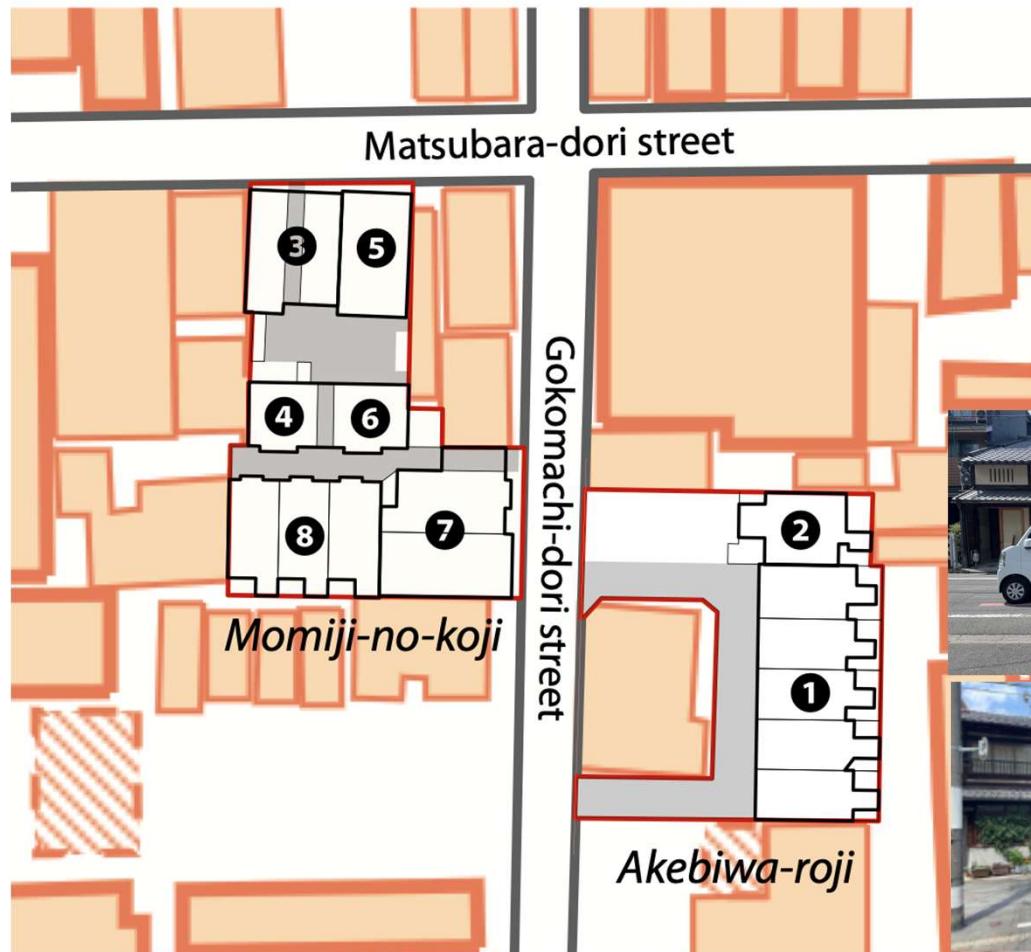
Momiji-no-koji project, Kyoto



Machiya (townhouse) regeneration project (2014-2022)
undertaken by the Kyoto Machiya Regeneration
Research Group



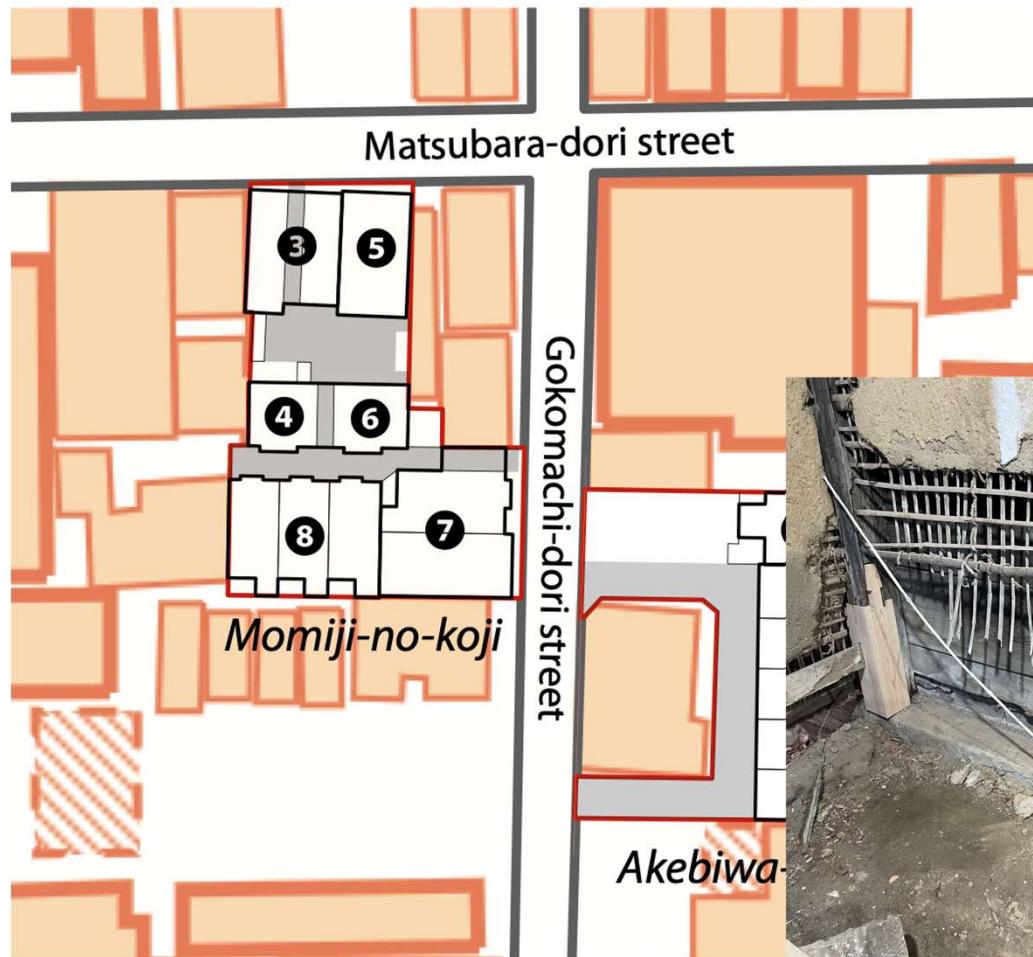
Momiji-no-koji project, Kyoto



Across the street, the east side has been regenerated as residential housing, and the west side as a group of shops. On the west side, the courtyards of each unit have been combined into one to create a shared garden.



Momiji-no-koji project, Kyoto / 1. Earthquake Resistance

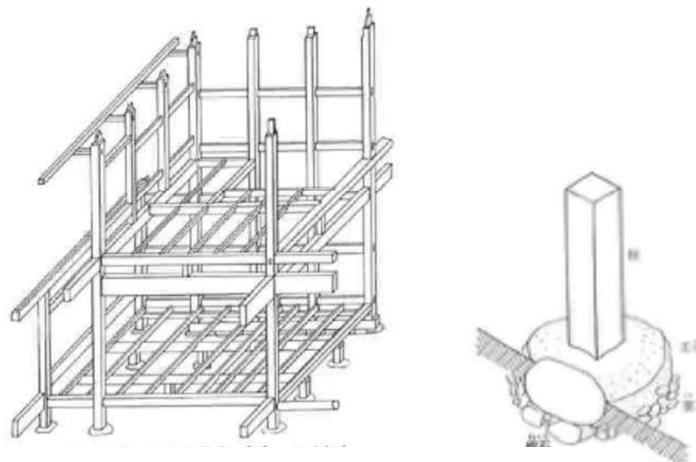


“Sounding” measures were taken, including repairing the foundations, replacing damaged components, and reinforcing the walls

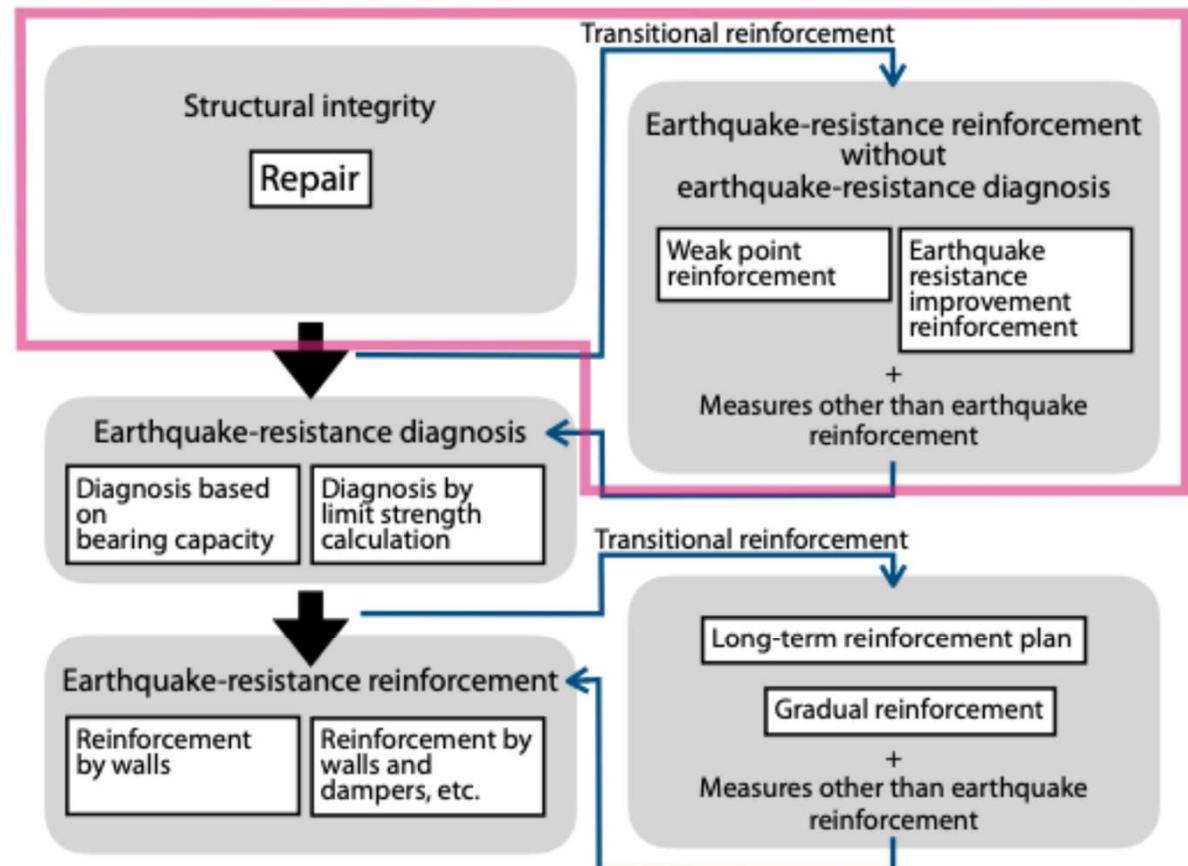


Earthquake resistance in traditional construction methods

The principle: “The most important thing is to first repair them and carry out appropriate maintenance to ensure the structure is sound. Then, a seismic assessment is conducted and based on the results, necessary measures such as seismic reinforcement are taken”

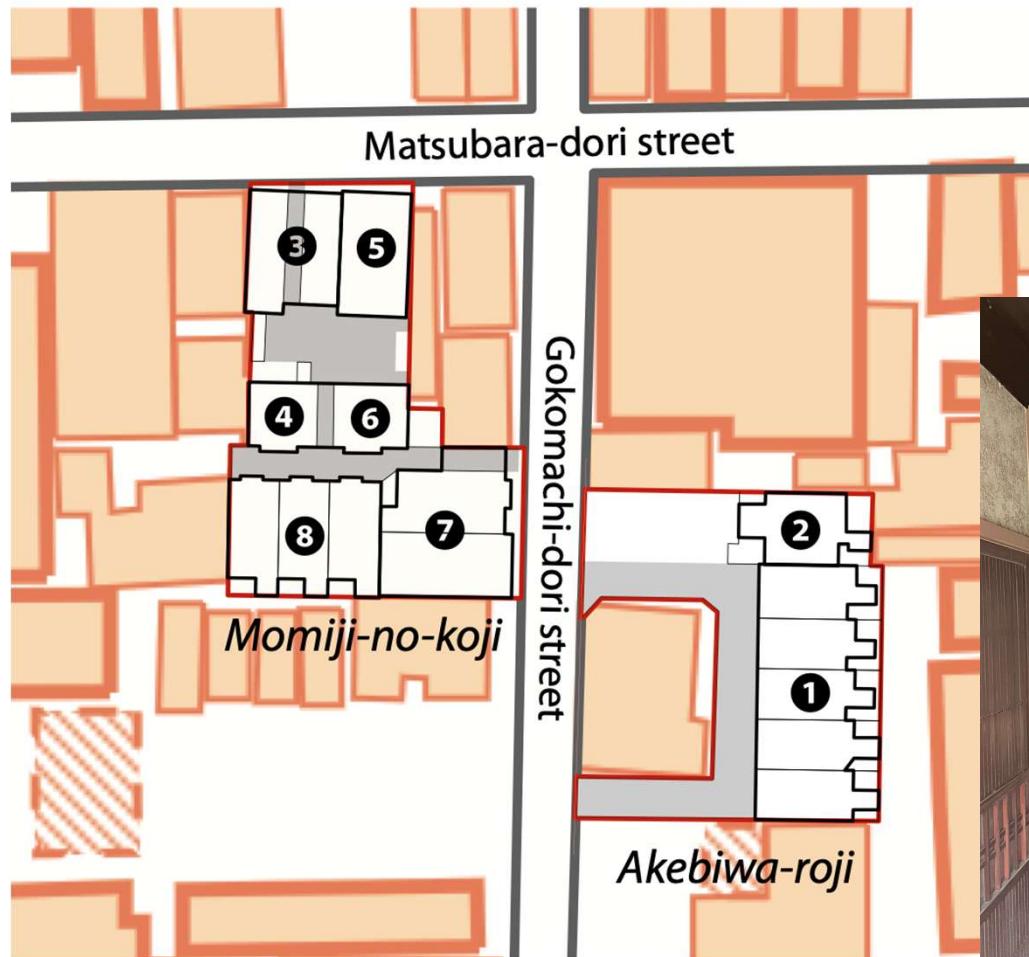


Traditional Japanese wooden frame
The foundation is not fixed



The Agency for Cultural Affairs: "Guidelines for Earthquake Resistance Measures for Groups of Traditional Buildings" (2020).

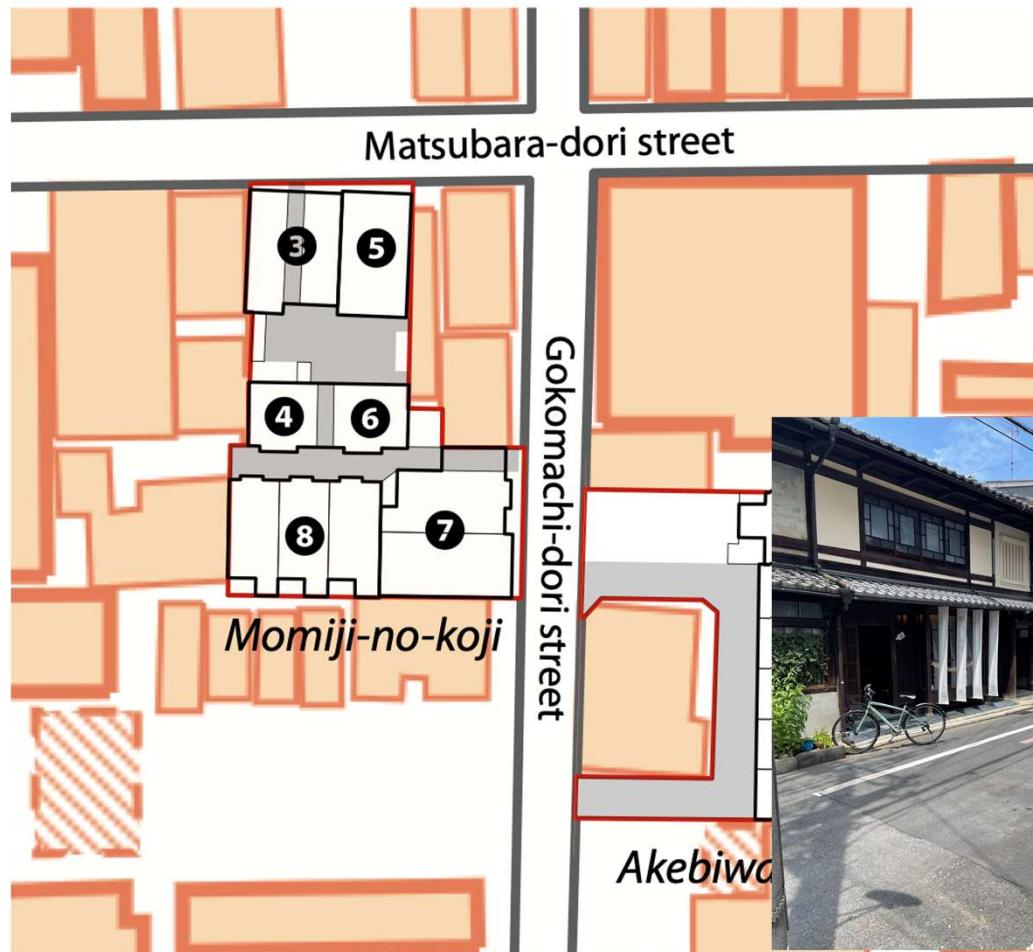
Momiji-no-koji project, Kyoto / 2. Fireproof



The fireproofing was carried out in accordance with Kyoto City guidelines without compromising the traditional design



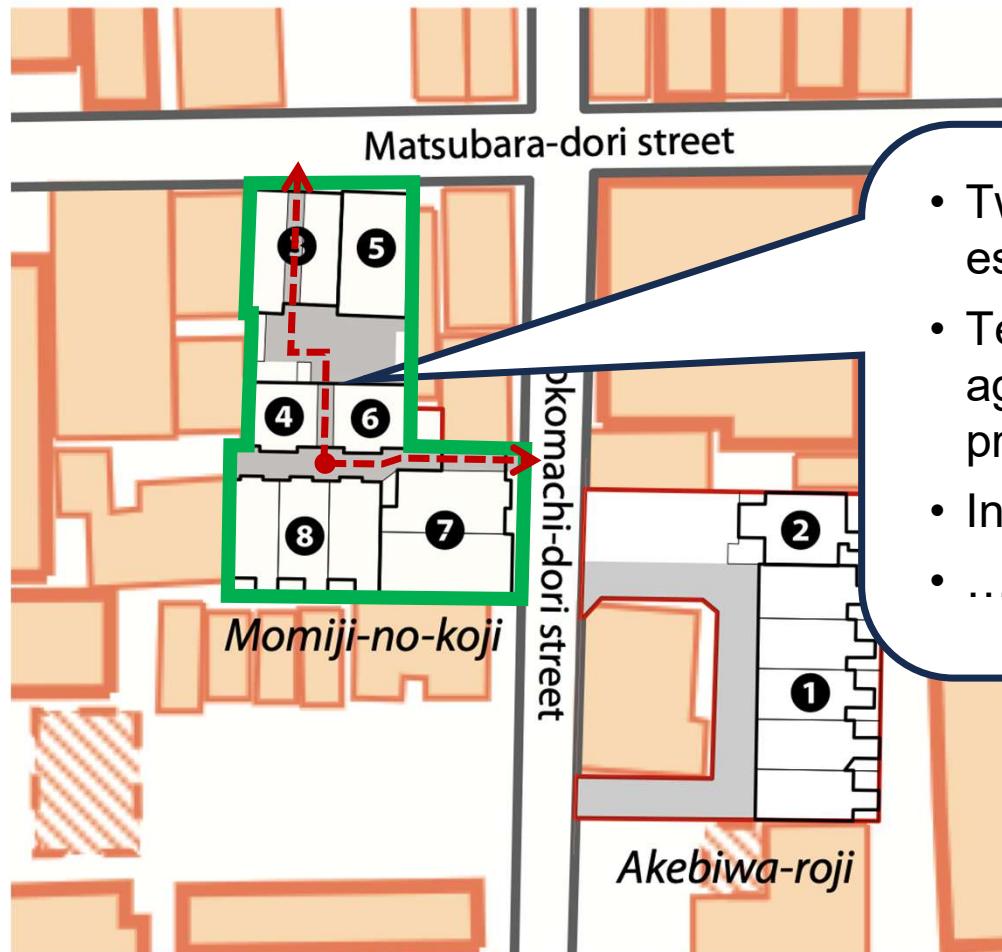
Momiji-no-koji project, Kyoto / 3. Evacuation



The biggest problem was evacuation. The building at the back was not adjacent to the 4m wide road. Fortunately, Kyoto City had a system in place that allowed multiple buildings to be built on the same site in cases like this.



Momiji-no-koji project, Kyoto / 3. Evacuation



The biggest problem was evacuation. The

- Two evacuation routes to the road were established
- Tenants signed a disaster prevention agreement and conducted disaster prevention drills twice a year
- Interlocking fire alarms were installed
-



At the time of Great East Japan Earthquake, 2011.3.11



SAWARA,
Chiba pref.
March 11, 2011
Great East Japan
Earthquake

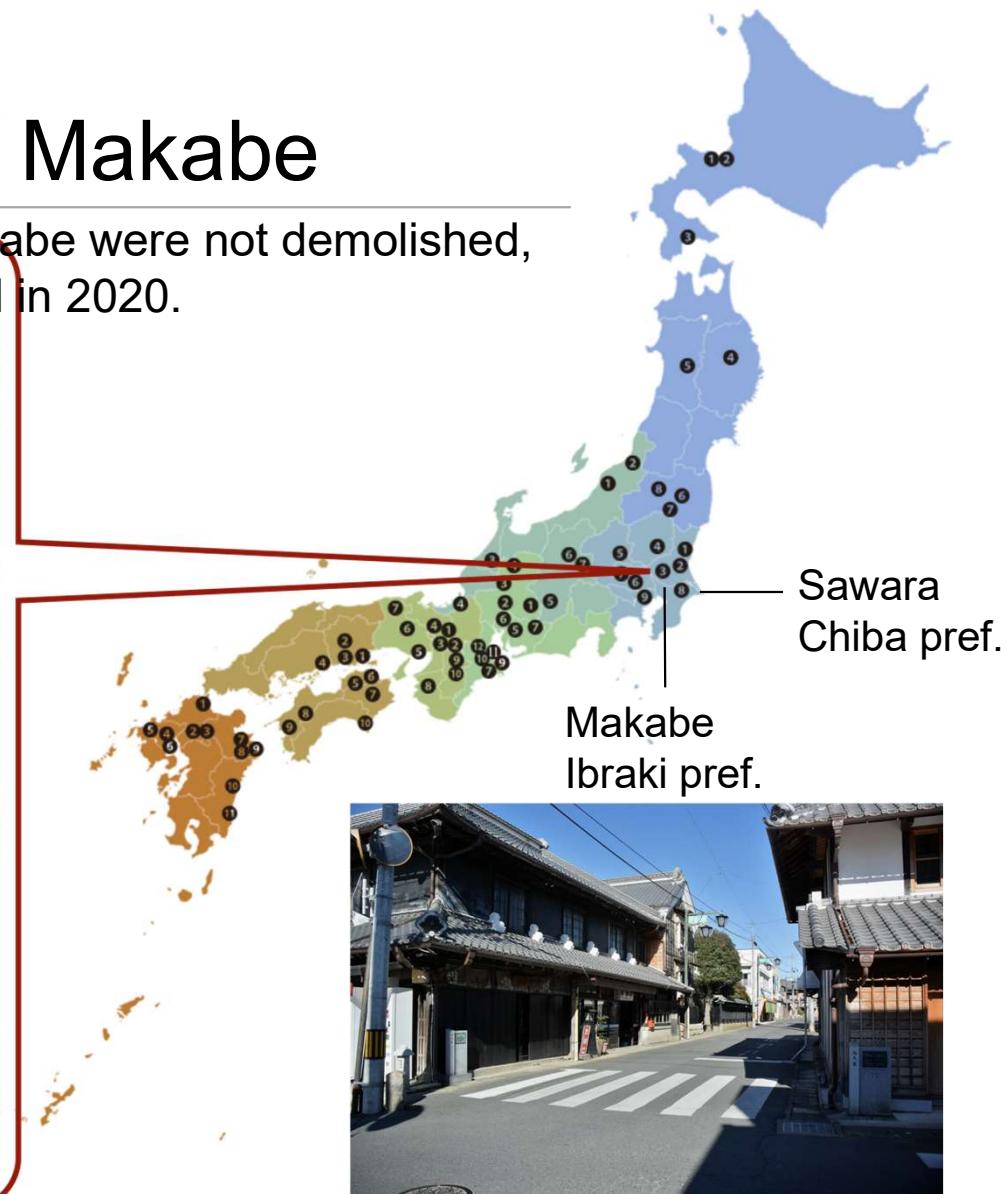
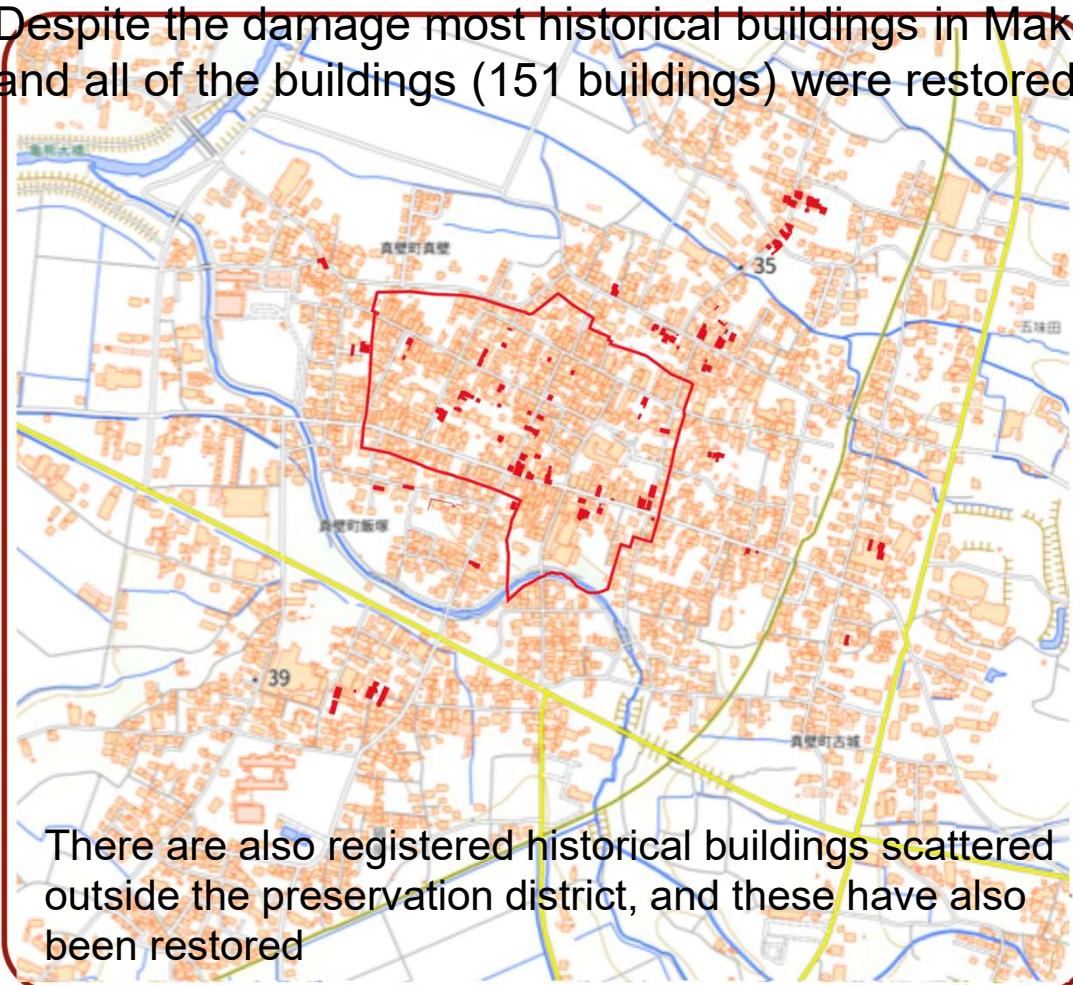
The earthquake's
strength: lower 6*

- 1) Structural collapse was minimal.
- 2) Earthen tiled roofs and wall plaster fell off.

*the Japanese seismic intensity scale, with 7 being the highest

After a disaster: The Case of Makabe

Despite the damage most historical buildings in Makabe were not demolished, and all of the buildings (151 buildings) were restored in 2020.

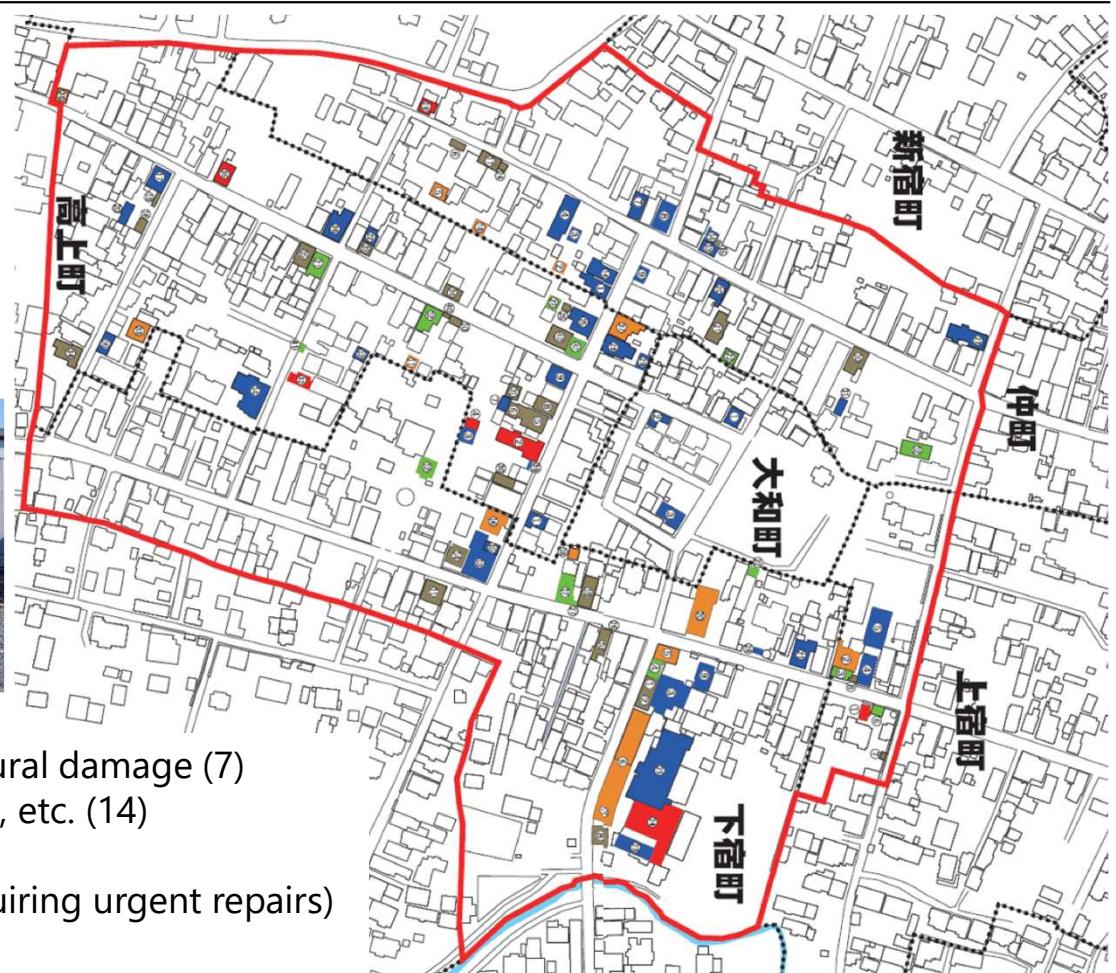


Damage to buildings in the preservation district

The strength of the earthquake and the damage to buildings were almost the same as in Sawara. a) Buildings that had been repaired were spared damage. b) Stone-built buildings collapsed



- Collapsed/Semi-collapsed: Buildings with structural damage (7)
- Buildings with damage to the roof, exterior walls, etc. (14)
- Buildings with damage only to the roof (40)
- Buildings with relatively minor damage (not requiring urgent repairs) (14)
- Buildings with no visible damage from the outside (31)



Restoration

By 2020, most of the damaged buildings had been restored without demolition. During this time, approximately 100 buildings within the preservation district and 26 listed buildings outside the district were restored as part of the disaster recovery project.



Restoration



Lessons learned from Makabe

Early decisions on disaster response policies can dispel the concerns of residents (= building owners)

March 11 An earthquake occurred (14:46 M9.0). Two city officials checked on the safety of elderly people living alone, warning people to be careful of falling roof tiles. An aftershock occurred (15:15, M7.7)

March 12 Two city officials take photos of the damage

March 13 Emergency risk assessment begins (- March 17)

March 14 Started lending roof protection tarps to cultural property owners

March 16 Approximate damage count

March 17 Agency for Cultural Affairs conducts damage survey

March 19 Initial response policy determined

March 25 "Regarding repair work for traditional cultural properties in the wake of the earthquake" distributed

March 29 "Regarding registered cultural properties in the wake of the earthquake" distributed

April 14 Request for assistance from specialized staff through the National Council for Preservation Districts

April 21 Discussion meeting on townscape preservation held

April 25 "Regarding detailed surveys on repairs" distributed

April 27 On-site meetings with the Agency for Cultural Affairs and Kameyama City advance staff

May 8 Support staff from other cities arrived. After detailed investigations began.

June Assembly: Disaster Recovery Supplementary Budget Approved

June 17: Subsidy rates for disaster recovery were set and specific properties were added.

July 1 Disaster recovery subsidies approved.

Sep 30 Disaster recovery work begins

Lessons learned from Makabe

One week after the earthquake, the initial response policy was decided and distributed to residents.

One month after the earthquake, a recovery survey was launched with the support of specialized staff from municipalities across the country.

Three months after the earthquake, the repair subsidy rate was increased and the necessary budgetary measures were taken.

March 16 Approximate damage count

March 17 Agency for Cultural Affairs conducts damage survey

March 19 Initial response policy determined

March 25 "Regarding repair work for traditional cultural properties in the wake of the earthquake" distributed

March 29 "Regarding registered cultural properties in the wake of the earthquake" distributed

April 14 Request for assistance from specialized staff through the National Council for Preservation Districts

April 21 Discussion meeting on townscape preservation held

April 25 "Regarding detailed surveys on repairs" distributed

April 27 On-site meetings with the Agency for Cultural Affairs and Kameyama City advance staff

May 8 Support staff from other cities arrived. After detailed investigations began.

June Assembly: Disaster Recovery Supplementary Budget Approved

June 17: Subsidy rates for disaster recovery were set and specific properties were added.

July 1 Disaster recovery subsidies approved.

Sep 30 Disaster recovery work begins

Nankai Trough Earthquake

In Japan, it is predicted that there is an 80% chance of a major earthquake occurring in the Nankai Trough within the next 30 years.

In order to increase resilience, in addition to a narrow disaster prevention plan centered on evacuation, it is necessary to implement the following measures mentioned above.

- Create detailed records for each building
- Implement effective seismic repair and reinforcement methods that preserve historic buildings
- Establish budgetary measures for restoration
- Regularly implement community development /local revitalization activities that utilize historic buildings

