

# 関東大震災の正体と教訓

## Characteristics of the 1923 Great Kanto Earthquake and Lessons Learned

武村雅之 Masayuki Takemura

名古屋大学減災連携研究センター Disaster Mitigation Research Center, Nagoya University





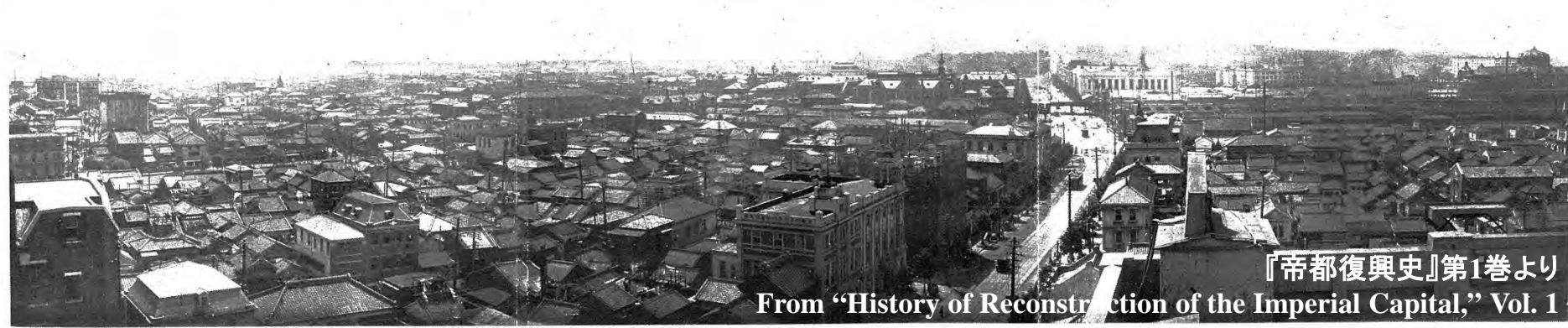
# 関東大震災で東京が最大の被災地となった原因

## Why Tokyo became the largest disaster area in the Great Kanto Earthquake

1868年明治維新以降の産業都市化政策が都市の基盤整備をしないままに軟弱地盤上に人口集中をさせたこと

The industrial urbanization policy after the Meiji Restoration in 1868 resulted in a concentrated population on soft ground before the city had developed sufficient infrastructure.

震災前の東京中心部 Central Tokyo before the earthquake



満足な道路も少なく木造建物がびっしり立った銀座・日本橋・神田の様子

Ginza, Nihonbashi, and Kanda, where there were few roads of good width and wooden buildings were built close together

# 関東大震災の規模 Scale of the Great Kanto Earthquake

日本の自然災害史上最大の被害、死者、被害額とも2011年の東日本大震災の約10倍(人口比、GDP比)。そのうち約70%が東京のでの被害

It was the most destructive disaster caused by natural hazards in Japan, causing about 10 times as many deaths and damages as the Great East Japan Earthquake of 2011 (in terms of percentage of population and GDP).

Approximately 70% of the damage was concentrated in Tokyo.

## 近年の大震災との被害額の比較

A comparison of loss and damage caused by recent major earthquakes

項目 Earthquake	関東 Kanto	阪神・淡路 Hanshin Awaji	東日本 East Japan	
発生年 Year	大正12年 1923	平成7年 1995	平成23年 2011	
地震規模 Magnitude (M)	7.9 (8.1)	7.3	9.0	
死者不明 (人) Dead and missing (people)	約10万5千 Approx. 105,000	約5千5百 Approx. 5,500	約1万8千 Approx. 18,000	
家屋被災世帯 Households whose houses were damaged	約70万 Approx. 700,000	約25万 Approx. 250,000	約30万 Approx. 300,000	
経済被害 Economic damage	損害総額 Total loss	55億円 5.5 billion yen	9兆6千億円 9.6 trillion yen	16兆9千億円 16.9 trillion yen
	GDP	150億円 15 billion yen	510兆円 510 trillion yen	490兆円 490 trillion yen
	GDP比 % of GDP	36.7%	1.9%	3.4%
	国家予算 National budget	15億円 1.5 billion yen	71兆円 71 trillion yen	92兆円 92 trillion yen
	予算比 % of total loss to the national budget	366.7%	13.5%	18.4%

関東大震災時はGDP(国内総生産)でなくGNP(国民総生産)

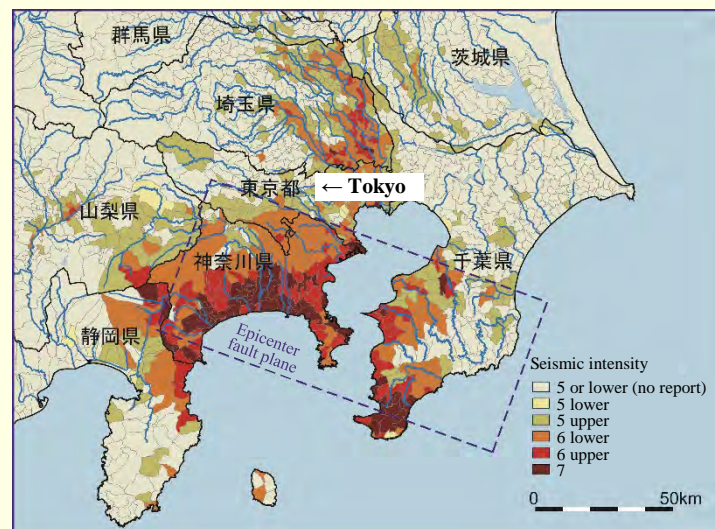
死者数には関連死は含まれていない

At the time of the Great Kanto Earthquake, GNP (Gross National Product) was used. GDP (Gross Domestic Product) was not yet in use. Number of deaths does not include disaster-related deaths.

武村雅之(2018)より作成 Created by Masayuki Takemura (2018)

## 関東地震と震源と揺れの分布

Epicenter and distribution of tremors of the Kanto Earthquake



諸井・武村(2002)より作成

Created by Moroi and Takemura (2002)

東京は震源から離れ、揺れの中心ではなかった。このことは当時の東京がいかに地震に弱い街であったかを表している

Tokyo was far from the epicenter and was not the center of the tremors, yet the massive damage caused shows how vulnerable Tokyo was to earthquakes at the time.



# 帝都復興事業(1924年から1930年)

## The Imperial Capital Reconstruction Project (1924-1930)

東京市民は「二度とあんな惨めなことになりたくない！」と立ち上がった

Citizens of Tokyo rose up together, saying “We don’t want to suffer that misery ever again!”

総額は約7億2450万円  
(現在の価値で約4兆円)

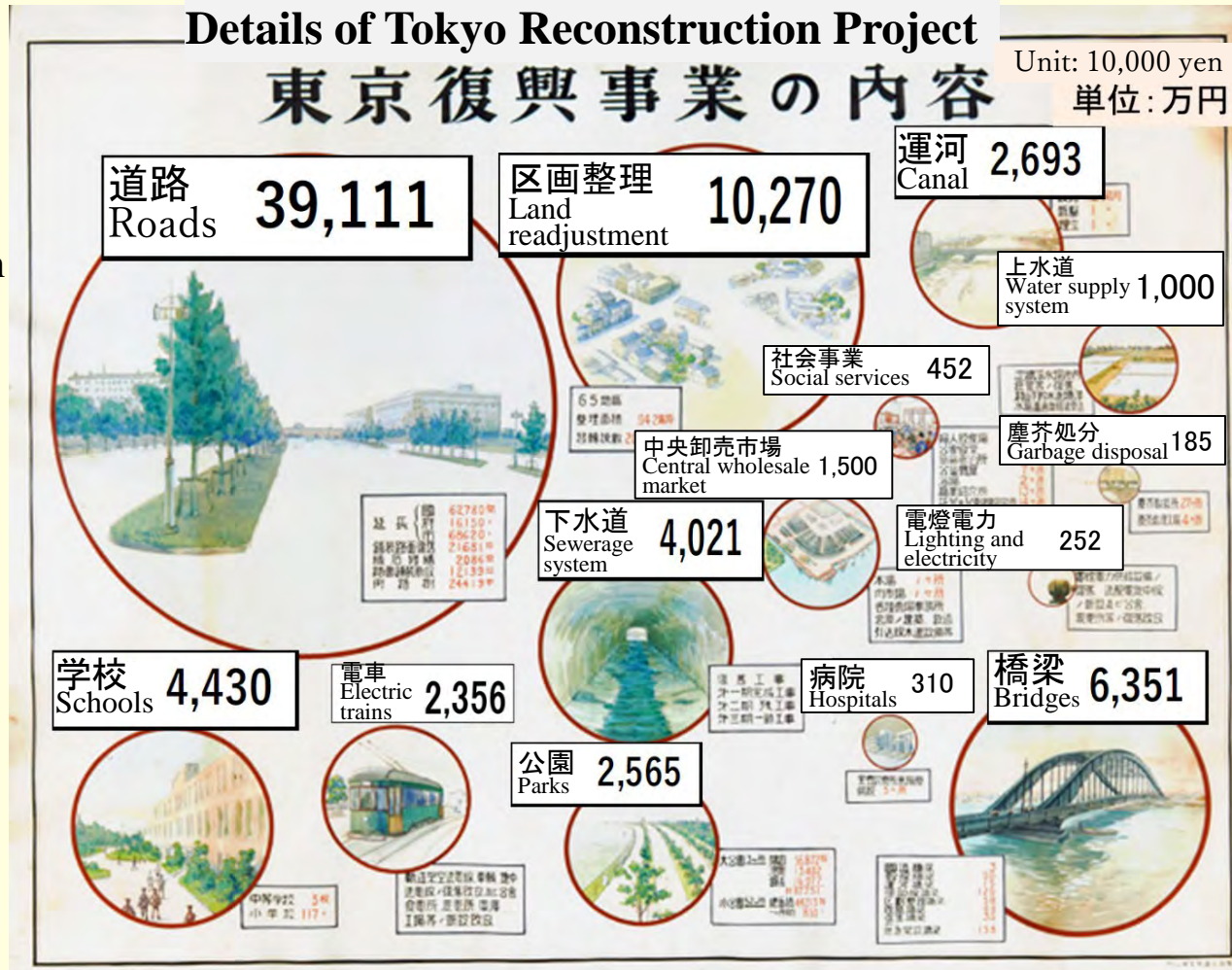
The total cost was about 724.5 million yen (about 4 trillion yen in current value)

### 事業の特性:

耐震・耐火を前提に、  
国民的合意の下で、公共性を第一に、首都として恥ずかしくない街にする

### Objective of the project:

Create a city as the capital of Japan that the people can be proud of, while ensuring earthquake and fire resilience, prioritizing the public interest under a national consensus.



復興記念館に展示されている東京における帝都復興事業の内容と費用の説明パネル  
(復興記念館收藏品)より

From a panel on display at the Fukko Kinenkan (Great Kanto Earthquake Memorial Museum) explaining the details and costs of the Imperial Capital Reconstruction Project in Tokyo (from the collection of the Fukko Kinenkan)

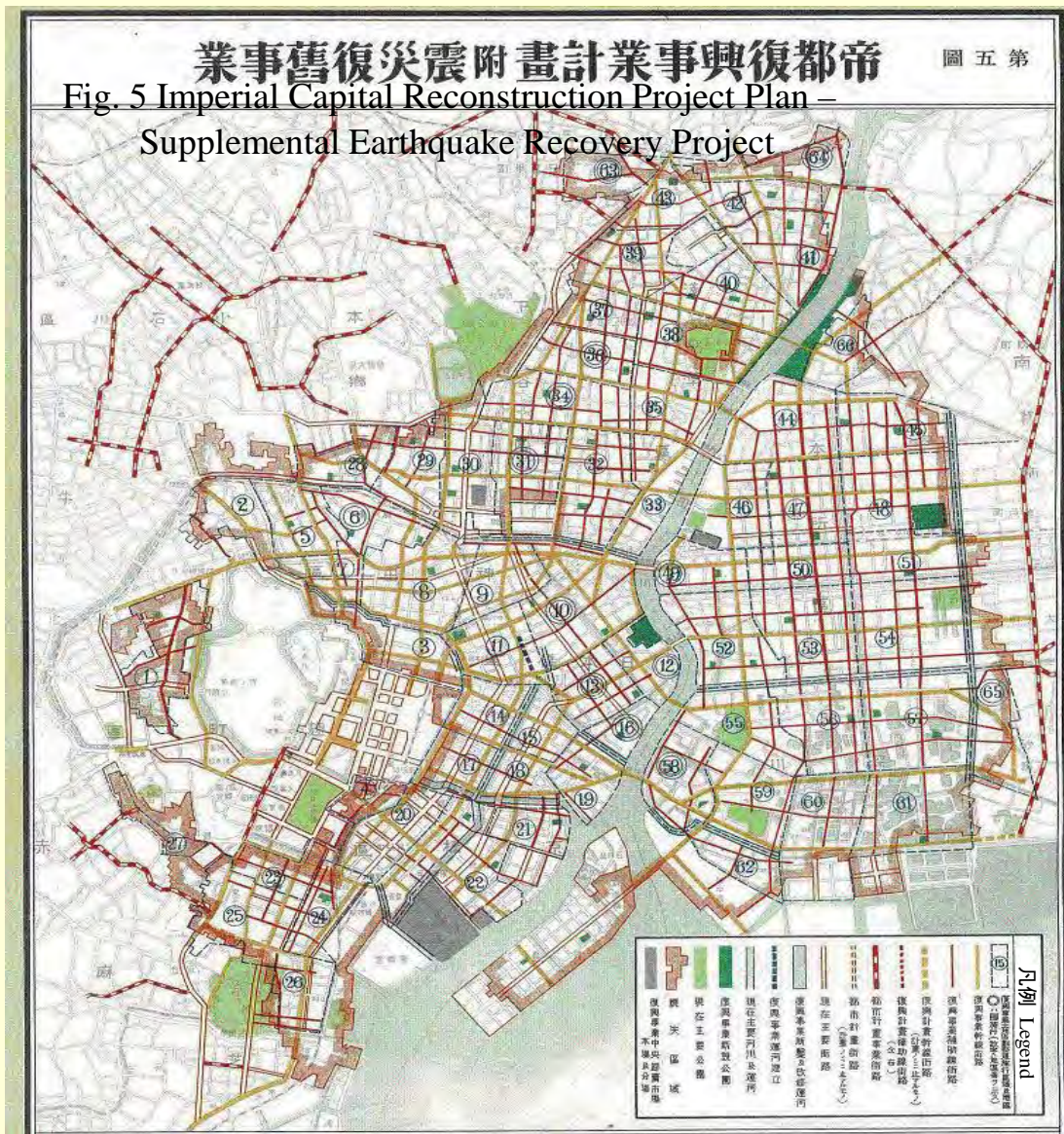


# 土地区画整理

## Land readjustment

誰一人として地域から引っ越しをさせないために、土地所有者から1割(減歩率)の土地を無償で提供してもらい、それで道路をつくって、残りの土地を所有分に応じて分けて住み直す。減歩率が1割以上になる場合にその分を補償する。

In order to avoid people having to move away from their communities, landowners were asked to donate 10% of their land. Roads were built using the donated land, and the remaining land was reallocated in proportion to the amount owned. If more than 10% was required, the landowner was compensated for that amount.



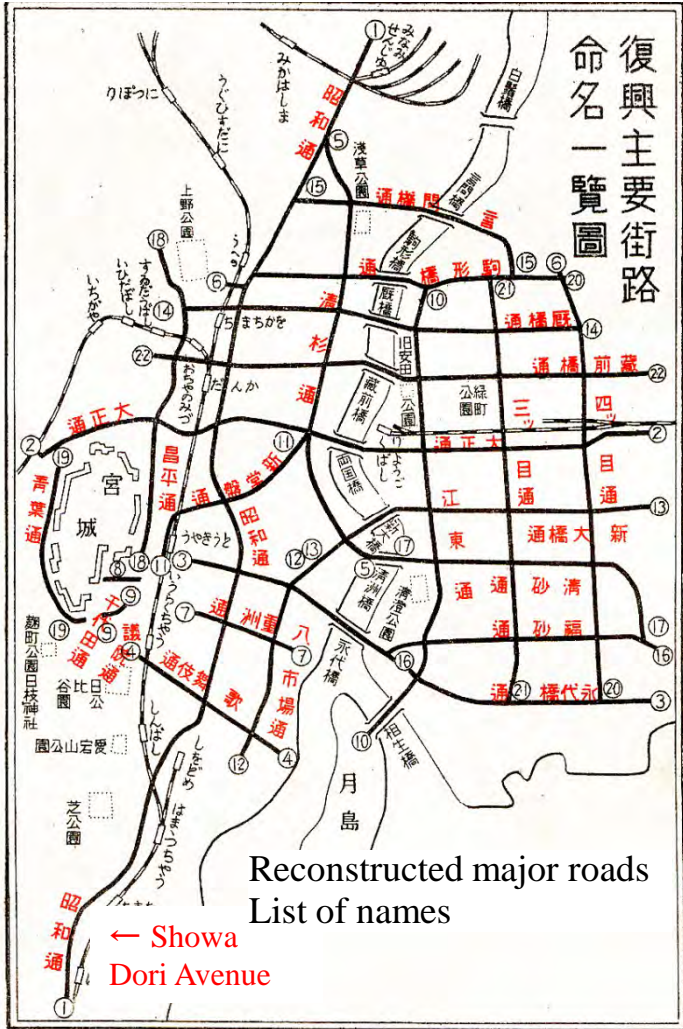
帝都復興計画事業図(東京市 昭和5年3月)

Map of the Imperial Capital Reconstruction Project (City of Tokyo, March 1930)



# 街路設計 Road design

国、幹線街路(幅員22m以上)52線  
 東京市、補助線街路(22m以下)122線  
 National and arterial roads (>22m wide): 52 routes  
 Auxiliary roads in the City of Tokyo (<22m wide): 122 routes



主要22線  
 22 major roads



幹線1号  
 昭和通り  
 Arterial road  
 No. 1 Showa  
 Dori Avenue



『帝都復興史』第1巻より  
 From "History of Reconstruction of the Imperial  
 Capital," Vol. 1

東京日日新聞(1930年3月15日)より  
 From the Tokyo Nichinichi Shimbun (March 15, 1930)

# 橋梁設計の方針 Policy for bridge design

震災時、橋梁は焼け落ち、傾き、破損して366橋が破損、猛火に追われたる市民は多数焼死。

366 bridges were burned down, bent, or damaged by the earthquake, and many citizens were burned to death amid the raging fires.

(このような反省に立って)

Reflections on this catastrophe:

第一に耐震耐火構造を徹底する

The highest priority was put on ensuring earthquake- and fire-resilient construction.

(さらに、美観も考慮する)

Aesthetics were also taken into consideration.

壮観ではあるが浮華軽薄な装飾を避けて、見あきのしない明るい感じを出すこと。親柱、欄干等などもなるべく目ざわりにならないように、かつ空の眺望を妨げないように細心の注意を払う。

Excessive, frivolous decorations should be avoided, while creating a bright, pleasant and interesting appearance. The main pillars, balustrades, etc. should be carefully designed to be unobtrusive and not obstruct the view of the sky.

『帝都復興史』第2巻より

From "History of Reconstruction of the Imperial Capital," Vol. 2



当夜の永代橋 徳永柳洲作  
Eitaibashi Bridge on the night of the Earthquake  
(Drawn by Ryushu Tokunaga)

修繕補強の194橋を含め全部で576橋を架橋  
576 bridges were built, including 194 bridges that were repaired and reinforced.



(例)隅田川の橋梁  
 道路橋16橋のうち復興  
 橋梁は10橋、今も現役  
 で活躍

**Example:  
 Bridges on the Sumida  
 River**

Of the 16 road bridges, 10  
 reconstructed bridges are  
 still in service.

永代橋と清洲橋は、  
 国の重要文化財指定

Eitaibashi Bridge and  
 Kiyosubashi Bridge  
 are designated as  
 National Important  
 Cultural Properties.

Sumida River	隅田川
Aioibashi Br.	相生橋 清澄通り Kiyosumi Dori Av.
Eitaibashi Br.	永代橋 永代通り Eitai Dori Av.
Sumida Ohashi Br.	隅田大橋 高速深川線 Metropolitan Expressway Fukagawa Line
Kiyosubashi Br.	清洲橋 清洲橋通り Kiyosubashi Dori Av.
Shin-Ohashi Br.	新大橋 新大橋通り Shin-Ohashi Dori Av. Metropolitan Expressway Komatsugawa Line 高速小松川線
Ryogokubashi Br. (JR Sobu Line)	両国橋 靖国通り (京葉道路) (JR総武線) Yasukuni Dori Av. (Keiyo Road)
Kuramaebashi Br.	蔵前橋 蔵前橋通り Kuramaebashi Dori Av.
Umayabashi Br.	厩橋 春日通り Kasuga Dori Av.
Komagatabashi Br.	駒形橋 浅草通り Asakusa Dori Av.
Azumabashi Br. (Tobu Skytree Line)(東武スカイツリー線)	吾妻橋 雷門通り Kaminarimon Dori Av.
Kototoibashi Br.	言問橋 言問通り Kototoi Dori Av.
Sakurabashi Br.	桜橋
Shirahigebashi Br.	白髭橋 明治通り Meiji Dori Av.
Suijin Ohashi Br.	水神大橋
Senju-Shioiri Ohashi Br. (JR Joban Line)	千住汐入大橋 (JR常磐線)
Senju Ohashi Br.	千住大橋 日光街道 Nikko Kaido Route



武村(2023)より  
 From Takemura (2023)



# 公園建設 Construction of parks

国が3大公園(隅田、錦糸、浜町)、東京市が52復興小公園建設

The national government built three major parks (Sumida, Kinshi, and Hamacho) and the City of Tokyo built 52 small parks.

小公園は当時の小学校の狭さによる弊害を解消するためまた、児童が利用しない時は一般市民の憩いの場となるよう、モダンで夢のような空間を与える地域のシンボルとして造られた。

Small parks were built as a symbol of the community to solve the problem of limited space at elementary schools at that time and to provide modern, fun spaces for the general public to relax when the children were not using the playground.

その後の戦争で内部は破壊され、往時の姿に戻ることにはなかった。

The subsequent war destroyed the parks and they were never restored to their former glory.



絵葉書より From a postcard

隅田公園(世界に誇れる臨川公園)  
Sumida Park (world-class riverfront park)



復興小公園(月島第一、第二)

Small Parks (Tsukishima No. 1 and No. 2)



『帝都復興史』第1巻より  
From "History of Reconstruction of the Imperial Capital," Vol. 1

浜町公園とコンドル記念塔  
Hamacho Park and Condor Memorial Tower



# 復興小学校 Reconstruction of Elementary Schools

戦後、多くの学校では児童数の増大で校舎が建て替えられたが、それらのほとんどは、現在の耐震基準を満たさず、耐震補強のためのブレースがみられる。

Many elementary schools built after World War II do not meet the current earthquake resistance standards, while they were only retrofitted with external bracing for seismic reinforcement.

これに対し、今も活躍する復興小学校の建物にはそれらが見あたらない。

The reconstructed elementary schools built in earlier times were solidly built and do not have any such external bracing.



泰明小学校 (中央区)

Taimei Elementary School (Chuo Ward)



常盤小学校 (中央区)

Tokiwa Elementary School (Chuo Ward)



九段小学校 (千代田区)

Kudan Elementary School (Chiyoda Ward)



黒門小学校 (台東区)

Kuromon Elementary School (Taito Ward)



旧十思小学校 (中央区)

Former Jisshi Elementary School (Chuo Ward)



旧小島小学校 (台東区)

Former Kojima Elementary School (Taito Ward)



# 第二次世界大戦後の問題 Problems after World War II

## (1) 高速化の弊害 Harmful impacts of expressway construction

空襲から生き残った震災復興の遺産である公園、橋、水辺が高速道路で破壊され、東京は、首都としての品格を失ったまま現在に至っている。

Parks, bridges, and waterfronts that survived the air raids were the legacy of reconstruction after the Earthquake, but they were interfered or obstructed by the expressways. Tokyo lost its dignity as a capital city, and remains as such.



『帝都復興史』第1巻より  
From the "History of Reconstruction of the Imperial Capital," Vol. 1  
復興当初の昭和通りと江戸橋  
Showa Dori Avenue and Edobashi Bridge just after reconstruction



おかしい建物が建ち、公園を蛇のようにのたうつ高速道路が通った  
Unsuitable looking buildings were built, and a snakelike highway is meandering through the park



現在の昭和通りと江戸橋  
Showa Dori Avenue and Edobashi Bridge today

日本橋川は首都高速道路の通り道となり、江戸橋の中柱は無残に切り取られ、昭和通りも緑地帯を消失した。  
The Nihonbashi River became the route of the Metropolitan Expressway, the central pillar of Edobashi Bridge was cruelly removed, and Showa Dori Avenue lost its green belt.



# 第二次世界大戦後の問題

## Problems after World War II

### (2) 郊外での木造密集地形成

Formation of suburban areas where wooden houses were densely built

東京は、震災後の1932年、現在の23区の範囲に街を広げたが、明治時代と同じように都市の基盤整備を怠り、人口集中を許した結果、今度は郊外に再び地震危険度が高い木造密集地を抱えることになる。

In 1932, after the Earthquake, Tokyo expanded to its present 23 wards, but as in the Meiji era, it neglected to improve the urban infrastructure and allowed the population to concentrate, resulting in areas of densely-packed wooden houses at high seismic risk, this time in the suburbs.

### 都心と郊外の道路率比較

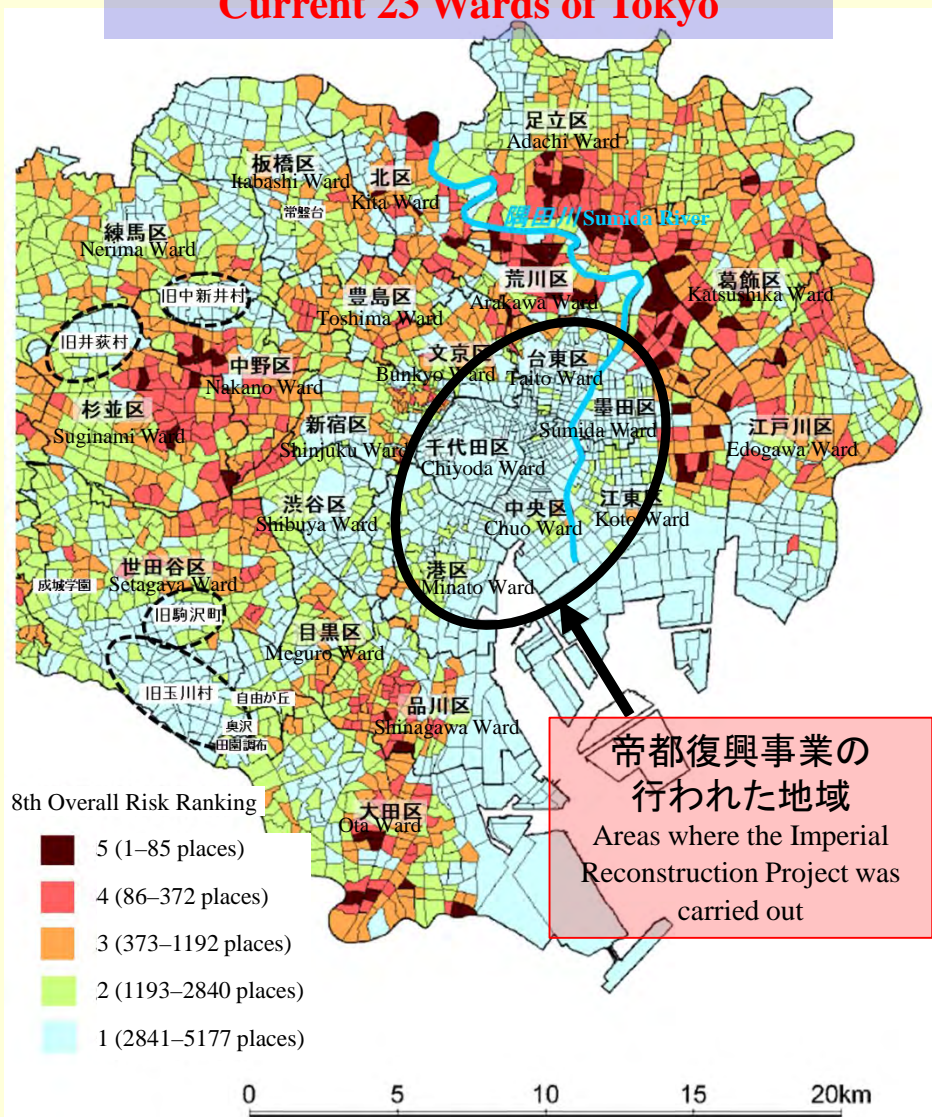
#### Comparison of urban and suburban road ratios

23区 23 wards	面積 Area (km <sup>2</sup> )	大正9年 1920	平成30年 2018	人口 Population	道路率 Road ratio
		人口 Population	人口 Population	増減 % of increase and decrease	(%)
都心8区 8 wards in central Tokyo	127.73	2,132,028	1,894,592	0.9	19.7
郊外15区 15 wards in the suburbs	491.24	1,076,961	7,587,533	7.0	16.0

都心8区（荒川区・江東区を除く）の道路率22.9%

The road ratio in 8 wards in central Tokyo (excluding Arakawa and Koto wards) is 22.9%.

## 現在の東京23区 Current 23 Wards of Tokyo



## 地震危険度測定調査結果(東京都23区) Results of seismic risk measurement survey (23 wards of Tokyo)



# 第二次世界大戦後の問題 Problems after World War II

なぜ、東京が再び地震に怯えなければならない街に転落したか？

Why has Tokyo once again become a city that must fear earthquakes?

- 郊外の木造密集地域の形成(基盤整備なしの人口集中)  
Formation of suburban areas with densely-packed wooden houses (Population concentration without infrastructure development)
- 戦後、地盤沈下の放置で大規模なゼロメートル地帯形成(堤防破損で200万人が水没)  
After the war, land subsidence was left unaddressed, resulting in the formation of a massive zero-meter zone (2 million people would be flooded if the levees failed)
- 首都高速道路の水辺破壊(64東京五輪の弊害、品格喪失)  
Interfering of the waterfront landscape by the Metropolitan Expressways (a harmful effect of the 1964 Tokyo Olympics, loss of dignity)
- 都心部の容積率緩和による高層ビルの林立(地震時帰宅困難者の急増)  
Bristling skyscrapers due to the relaxation of the floor-area ratio in central Tokyo (rapid increase in the number of people who would have difficulty returning home after an earthquake)
- 湾岸埋め立て地の高層住宅の孤立問題 (第2次東京五輪の負の遺産)  
Problem of isolation of high-rise housing on reclaimed land in the bay area (negative legacy of the second Tokyo Olympics)

戦後日本は、平和国家として欧米に負けない国力をもち、国民の生活を豊かにしたいと立ち上がったが、関東大震災の復興時のような地震に強い街づくりや、首都としての品格は二の次でひたすら経済成長を目指してきた。そのつけが回って、現在の東京は再び地震に弱い街となってしまった。関東大震災発生100周年を控えて、大震災後の復興事業の理念を思い起こし、今こそ東京を地震に強い街に造りかえていかなければならない。

After World War II, Japan rose up, seeking to become a peaceful nation with the national strength to compete with Europe and the United States and to help enrich people's lives. However, the country has been pursuing economic growth, it has set aside earthquake resilience and the dignity of the capital city which had been priorities after the Great Kanto Earthquake. The consequences are felt in Tokyo today, which has once again become vulnerable to earthquakes. As we approach the 100th anniversary of the Great Kanto Earthquake, we must recall the principles of the reconstruction project that followed the Earthquake. Now is the time to rebuild Tokyo into a city that is strong enough to withstand earthquakes.