

あなたのまちの

地域危険度

Your Community's Earthquake Risk

平成25年
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地震に関する地域危険度測定調査（第7回）

The Seventh Community Earthquake Risk Assessment Study



東京都都市整備局

Bureau of Urban Development, Tokyo Metropolitan Government

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地震に関する地域危険度測定調査の沿革

東京都では、東京都震災対策条例(当時は震災予防条例)に基づき、昭和50年11月に第1回(区部)の地域危険度を公表しました。その後、市街地の変化を表わす建物などの最新データや新たな知見を取入れ、概ね5年ごとに調査を行っており、今回は第7回目の公表です。

今回の測定調査では、都内の市街化区域の5,133町丁目について、各地域における地震に関する危険性を、建物の倒壊及び火災について測定しました。

さらに第7回調査から、災害時の避難や消火・救助活

動のしやすさ(困難さ)を加味するため、「災害時活動困難度」(災害時の活動を支える道路等の基盤状況を評価する指標)を考慮した危険度の測定を始めました。

この調査を進めるに当たっては、防災分野の専門家などで構成する「地域危険度測定調査委員会」を設置し、より精度の高い新たな測定方法に改善を図るなど、調査全般にわたり検討してきました。

Background

In November 1975, the Tokyo Metropolitan Government announced the results of its first assessment of earthquake risks facing communities (limited to the Tokyo ward area at that time) based on the Tokyo Metropolitan Earthquake Preparedness Ordinance (then Earthquake Management Ordinance). Since then, studies have been conducted about once every five years incorporating new earthquake-related information and knowledge, and latest data on buildings and other changes in the urban landscape.

This seventh assessment examined 5,133 communities in Tokyo's urbanization areas. Each community's vulnerability to building collapse and fire hazards resulting from earthquakes

was assessed. And for the first time, this study also assessed risk that considered emergency response difficulty (an index derived from assessments of the existing roadway network, which supports emergency operations), to take into account how easy (difficult) it would be to conduct emergency response operations such as evacuation and firefighting.

In order to conduct this study, the Community Risk Assessment Committee, made up of disaster management experts, was formed to study all aspects of this investigation, including improvements for new, more accurate methods of assessment.



1 あなたの住んでいるまちは大丈夫？

Is Your Community Safe?



地震によるまちの危険性を測定します

日本は、地震の発生が世界の約1割を占める世界有数の地震国です。

南関東におけるマグニチュード7程度の大地震の発生確率は、今後30年以内に70%程度とされています。

大きな地震が起こった際、あなたのまちにはどのような危険があるのでしょうか？

地震が起こると、揺れによる建物の倒壊や火災の発生による延焼が大きな被害を引き起こす可能性があります。

本調査では、お住まいの町丁目ごとに、地震による危険性(地域危険度)を測定しました。



地域危険度はこのように活用できます

災害に強い都市づくりを進めるためには、道路や公園などの整備や建物の不燃化などの防災都市づくりを行うとともに、都民一人ひとりが日頃から十分な備えと対策を講じることが重要です。

地域危険度は、防災都市づくりを進める地域の選定に利用するとともに、都民の皆さんがそれぞれのまちで地震への備えを進めるためにご活用ください。



Assessing Your Community's Earthquake Risk

Japan is one of the most earthquake-prone countries in the world, experiencing about 10 percent of the world's temblors. Experts say that there is a 70 percent chance for a massive earthquake with a magnitude of about 7 to hit the southern Kanto region within the next 30 years.

What risks does your community face in the event of a huge earthquake? Ground shaking can trigger building collapse and the outbreak and spread of fires, resulting in devastating damage. This study assessed your community's earthquake risk.

How to Use This Earthquake Risk Assessment

In order to make Tokyo a city that can stand up to disasters, it would be important to not only build a disaster-resilient city by upgrading roads, parks, and other infrastructure, and making buildings fire-resistant, but to also have each and every resident of Tokyo fully prepared for a disaster. This earthquake risk assessment will be used to select communities that need disaster-resilience improvements and it is hoped that it will also benefit the communities' residents in furthering their own preparations.



2. 地域危険度とは

What Is Community Earthquake Risk?

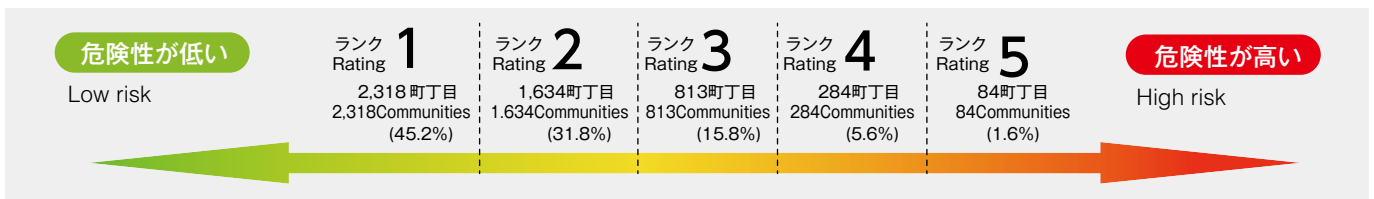
本調査では、以下の危険性を町丁目ごとに測定しています。

第7回調査から、災害時の避難や消火・救助活動のしやすさ(困難さ)を加味するため、「災害時活動困難度」(災害時の活動を支える道路等の基盤状況を評価する指標)を考慮した危険度の測定を始めました。

- 建物倒壊危険度 (建物倒壊の危険性)
- 火災危険度 (火災の発生による延焼の危険性)
- 総合危険度 (建物倒壊や延焼の危険性)
- 「災害時活動困難度」を考慮した危険度【新規】 (災害時の避難や消火・救助等の活動のしやすさ(困難さ)を考慮した危険性)

なお、地域危険度はそれぞれの危険度について、町丁目ごとの危険性の度合いを5つのランクに分けて、以下のように相対的に評価しています。

Community earthquake risk is a relative assessment that rates communities on a scale from 1 to 5 as follows according to the community's degree of vulnerability to the hazard.



(注) 危険度のランクは相対評価のため、安全性が向上していても、他の町丁目の安全性がさらに向上している場合には、危険な方向にランクが変化している場合があります。

Note: Since risk rating is a relative assessment, a community's rating could, despite safety improvements, change to the worse if other communities make even larger improvements.

どのような地震を想定しているのか

地震はいつ、どこで起きるか分かりません。そこで本調査では、特定の地震を想定するのではなく、全ての地域において、地震の強さなどを同じ条件で設定し危険性を測定しています。

災害時活動困難度とは

地震により建物が倒壊したり火災が発生したりした時には、危険地域からの避難や、消火・救助活動のしやすさ(困難さ)が、その後の被害の大きさに影響します。このような活動のしやすさ(困難さ)を、地域の道路網

の稠密さや幅員が広い道路の多さなど、道路基盤の整備状況から評価した指標が「災害時活動困難度」です。

どのように地域の危険性を測るのか

本調査では、木造、鉄筋コンクリート造などの建物構造、建築年代、階数などの種別ごとの棟数、建物用途ごとの火気器具や電熱器具の使用状況、道路や公園の整備状況などのデータをもとに、科学的に地震による危険性を測定しています(測定フロー参照)。

原則として、区部及び多摩地域の市街化区域を対象に、町丁目を単位として測定しています。

This study assesses each community's vulnerability to the following hazards. Risk in light of emergency response difficulty (an index derived from assessments of the existing roadway network, which supports emergency operations), was also assessed from this seventh study to take into account how easy (difficult) it would be to conduct emergency response operations such as evacuation and firefighting.

- Building collapse risk (danger of building collapse)
- Fire risk (danger of spread of fire)
- Combined risk (danger of building collapse and spread of fire)
- Risk in light of "emergency response difficulty" [new] (Risk in light of the ease (difficulty) of conducting emergency response operations such as evacuation and firefighting)

What Kind of Earthquake Is Assumed in the Study?

As it is not known when or where an earthquake will hit, this study does not assume the occurrence of a specific earthquake, but assesses risk by applying the same conditions, such

as seismic intensity, for all areas.

What Is "Emergency Response Difficulty"?

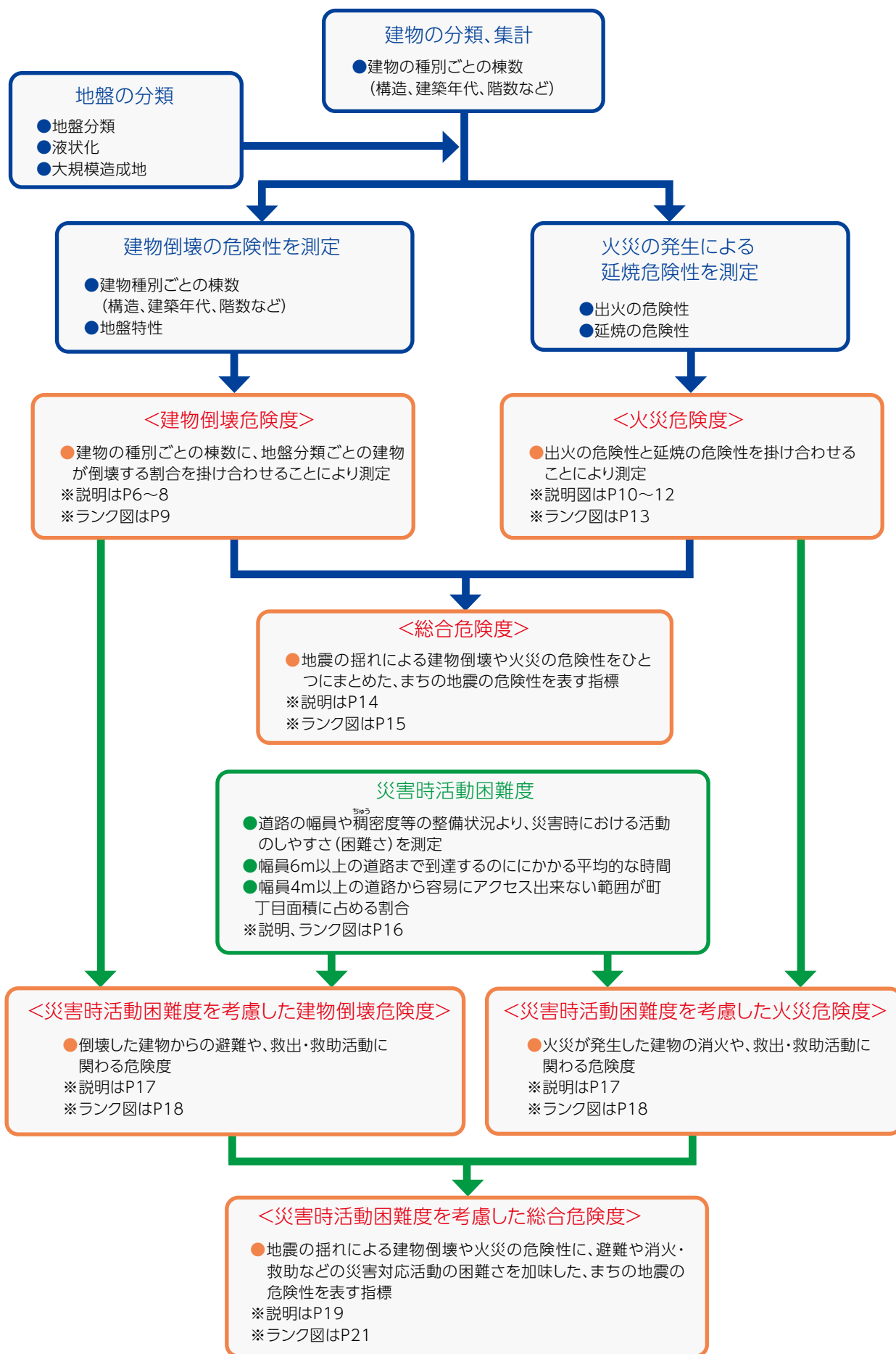
When buildings collapse or fires break out from an earthquake, how easy (or difficult) it is to evacuate from the stricken areas or conduct firefighting and rescue activities will affect the scale of further damage. "Emergency response difficulty" is an index of the ease or difficulty of such operations based on assessments of the existing road infrastructure including the density of the road network and the number of wide roads.

How Is Community Earthquake Risk Assessed?

This study scientifically assesses earthquake risk based on data such as the number of buildings by type of structure (wooden, reinforced concrete, etc), age, number of stories, etc.; the use of open-flame appliances or electric heating appliances by building purpose; and the state of roads and parks (see assessment flowchart). In principle, assessments were conducted for each community in the urbanization areas of the 23-ward area and Tama area of Tokyo.

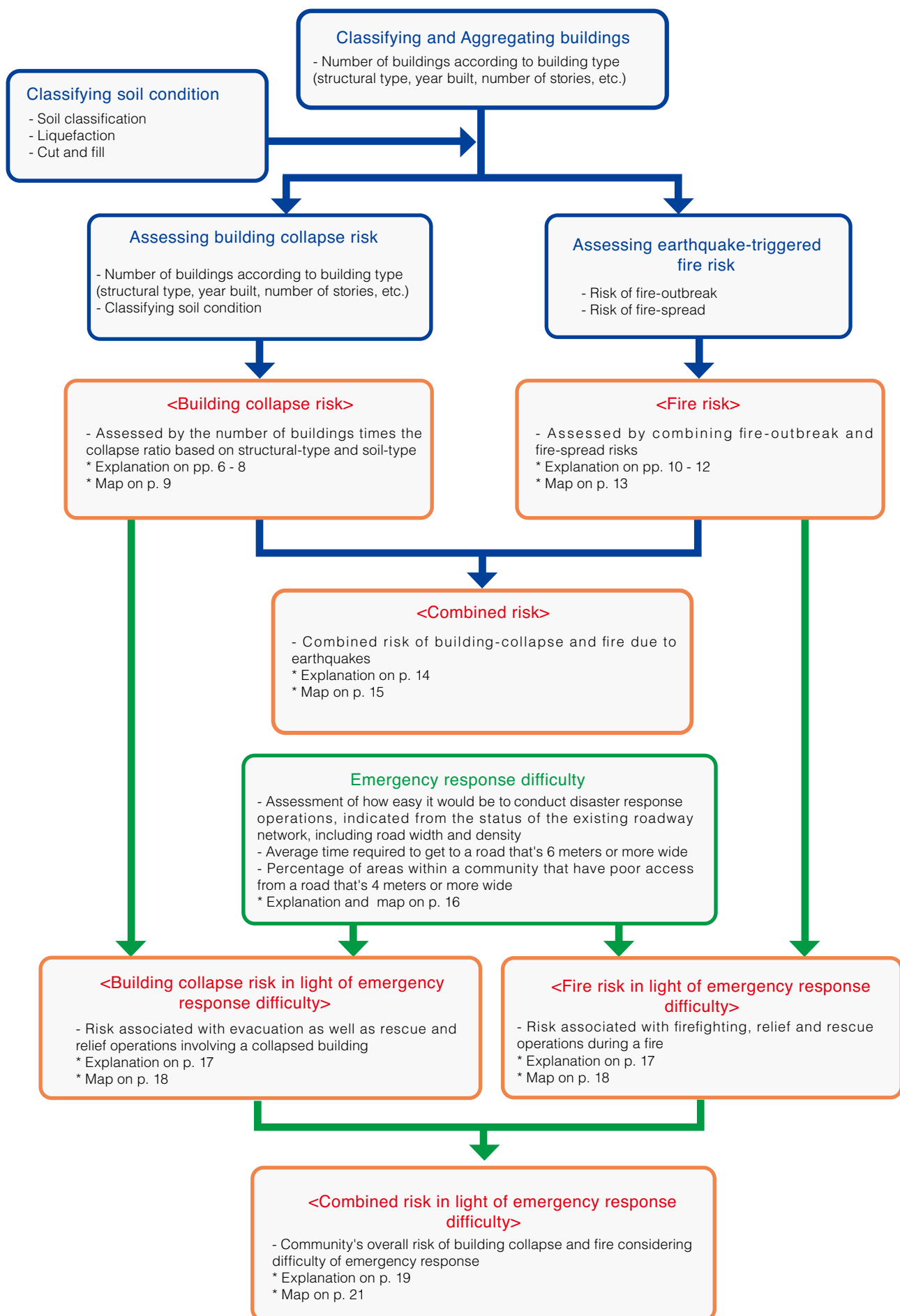


地域危険度の測定フロー Flowchart of Community Earthquake Risk Assessment





地域危険度の測定フロー Flowchart of Community Earthquake Risk Assessment





Q. 地域危険度は、東京都のまちづくりにどのように活用されるのですか？

How Will Earthquake Risk Assessment Be Used for Tokyo's Community Development?

A. 東京都では、地震被害から都民の生命と財産を守るために防災都市づくりを積極的に進めており、その一環として、地域危険度を測定し公表しています。

地域危険度は、「防災都市づくり推進計画」や延焼遮断帯となる沿道一体整備事業、建物の不燃化などを進める木造住宅密集地域整備事業などの各種事業を実施する地域の選定にも活用しています。

The Tokyo Metropolitan Government is pushing ahead with measures to build a disaster-resilient city in order to protect the lives and assets of its residents from earthquake damage. The publication of community earthquake risk assessments is one facet of such efforts. The earthquake risk assessment is also used in selecting areas to implement various projects such as the "Project to Promote Creation of a Disaster-Resilient City," road development projects to create firebreak belts, and projects to redevelop districts with close-set wooden houses by promoting measures such as the fire-resistance of buildings.

Q. 東京都の「被害想定」とは何が違うのですか？

How Does This Differ from the Tokyo Metropolitan Government "Earthquake Damage Estimates"?

A. 平成24年4月に公表した「首都直下地震等による東京の被害想定」は、特定の地震を想定していることから、想定した震源地から離れると揺れが少ない等、影響を受ける地域やその程度が限定的なものとなっています。一方、地域危険度は、都内の町丁目の地震に対する危険性を比較するため、特定の地震を想定するのではなく、全ての町丁目直下の地盤で同じ強さの揺れが生じた場合の危険性を測定している点が大きく異なります。

The damage estimates announced by the Tokyo Metropolitan Government in April 2012, are based on specific types of earthquakes. Because of this, the areas affected and the degree to which they are affected will be limited; for instance, less shaking would occur in areas located at a distance from the epicenter of the earthquake. A major difference between the 2012 damage estimate and this earthquake risk assessment is that this assessment attempts to compare the earthquake risks of communities within Tokyo by measuring risk when the same level of shaking occurs in the ground directly under all the communities, as opposed to a specific earthquake.

3. 地震の揺れによる建物の倒壊～建物倒壊危険度～

Building Collapse from Earthquake Ground Shaking

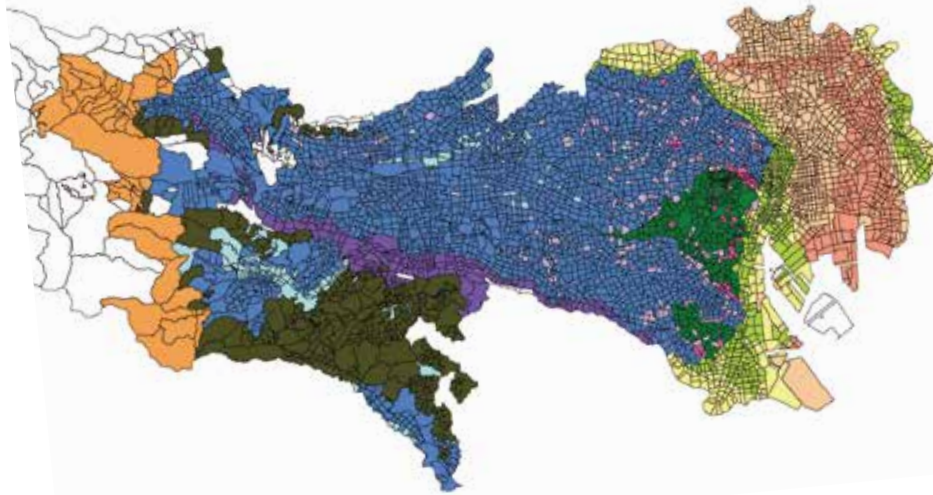
—Building Collapse Risk—

地震の揺れによって建物が壊れたり傾いたりする危険性の度合いを測定したものが「建物倒壊危険度」です。建物倒壊危険度は、地域の建物の種別と地盤分類により測定しています。

地盤の特徴

東京の地盤は、山地・丘陵地、山の手の台地と、下町の沖積低地、そして台地を刻む谷からできている谷底低地に分類されます。

沖積低地や谷底低地は、地震が起きた場合に揺れが増幅されやすいため、比較的被害が発生しやすい地域です。



<p>山地 Mountains</p> <p>丘陵 Hills</p> <p>台地 Tableland</p>	<p>山地 (1.0)</p> <p>主に丘陵地 (1.4)</p> <p>河成礫層の上に関東ローム層 (1.6)</p> <p>堆積粘土・砂層の上に関東ローム層 (1.7)</p>	<p>(増幅率)</p> <p>形成された年代が古く、洪積層を中心とした地盤です。固結した地盤のため地震が起きた場合でも揺れが増幅されにくいことから被害は発生しにくい地域です。</p> <p>The ground is chiefly diluvial soil deposited far back in history. This is hard ground, which tends not to amplify ground shaking from earthquakes. There is thus less probability for this area to suffer damages.</p>
<p>谷底低地 Valley Lowland</p>	<p>軟弱層の厚さ (増幅率)</p> <p>谷底低地1 3m未満 (1.5)</p> <p>谷底低地2 3m以上8m未満 (1.8)</p> <p>谷底低地3 8m以上 (2.0)</p>	<p>台地を刻む谷底での堆積物でできているため軟弱な地盤です。地震が起きた場合に沖積低地同様揺れが増幅されやすいことから比較的被害が発生しやすい地域です。</p> <p>This is soft soil made up of sediments deposited in valleys carved into the tableland. As with alluvial lowlands, shaking from earthquakes tends to be amplified in this area. There is thus a relatively high probability for this area to suffer damage.</p>
<p>沖積低地 Alluvial Lowland</p>	<p>軟弱層の厚さ (増幅率)</p> <p>沖積低地1 (主に河成礫) (1.5)</p> <p>沖積低地2 10m未満 (2.3)</p> <p>沖積低地3 10m以上25m未満 (2.6)</p> <p>沖積低地4 25m以上40m未満 (2.9)</p> <p>沖積低地5 40m以上 (2.9)</p>	<p>形成された年代が新しく、沖積層を中心とした地盤です。主に海面下での堆積物でできているため軟弱な地盤となっています。地震が起きた場合に揺れが増幅されやすいため、比較的被害が発生しやすい地域です。また、液状化も起こりやすい地域です。</p> <p>The ground is chiefly alluvial soil deposited more recently. This is soft soil mainly made up of sediments below sea level, which tends to amplify ground shaking from earthquakes. There is thus a relatively high probability for this area to suffer damages. Liquefaction is also more likely to occur here.</p>

Building collapse risk is a measure of the danger of buildings collapsing or tilting due to shaking from an earthquake. This risk is measured according to the type of buildings in the community and ground soil classification.

Ground Characteristics

The ground in Tokyo is categorized as mountains and hills, tableland of the Yamanote uptown area, alluvial lowland of the Shitamachi downtown area, and valley lowlands made up of valleys carved into the tableland. Alluvial lowlands and valley lowlands are areas that have a relatively high probability of damage occurring because the soil tends to amplify shakings from earthquakes.



建物の特性

建物については、木造、鉄筋コンクリート造などの構造、建築年代、階数別などに分類し、棟数を集計しています。

建物倒壊の危険性は、建物の耐震性が低いほど、建築年代が古いほど、高くなります。

建物倒壊危険度の測定方法

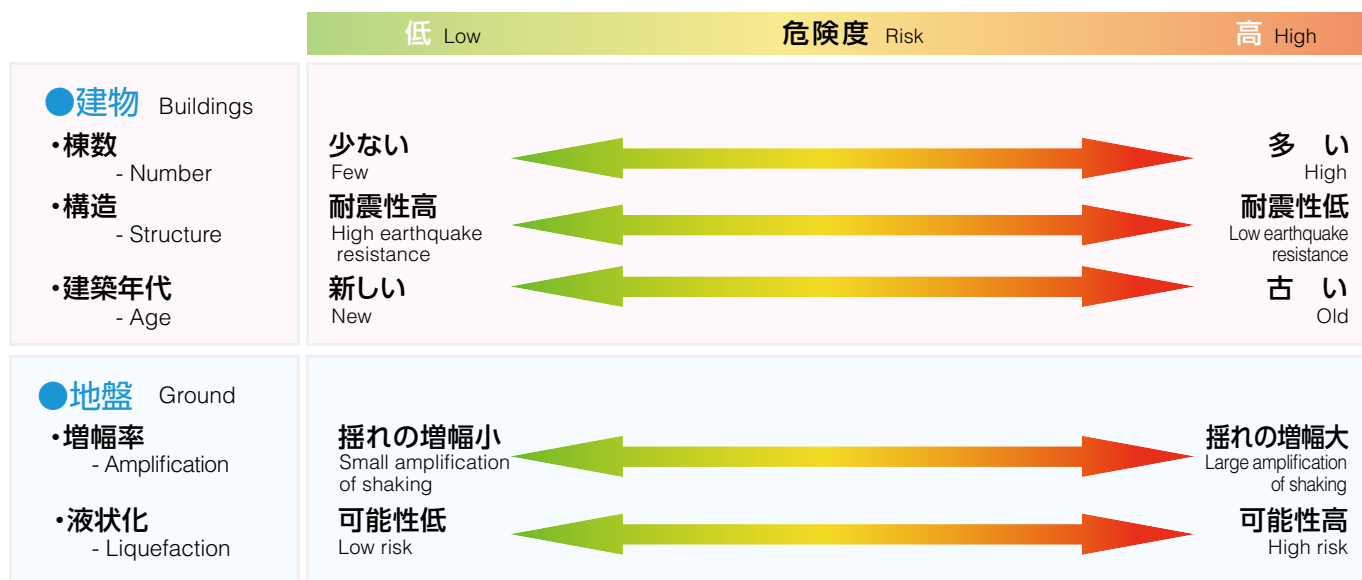
分類ごとに集計した建物量に地盤分類ごとの建物が壊れる割合を掛け合わせることで測定しています。

建物が壊れる割合は、阪神・淡路大震災などの過去の地震被害の調査事例などをもとに、地盤状況や建物種別ごとに設定しました。

また、沖積低地での地盤の液状化や丘陵地での大規模な造成地の影響も考慮しました。

(建物や地盤の特性と建物倒壊危険度の関係)

(Relation between Building/Ground Properties and Building Collapse Risk)



Building Properties

The numbers of buildings are tallied by type of structure (wooden or reinforced concrete, etc.), age, number of stories, and other categories.

The older and less quake-resistant the building is, the higher the risk of its collapse.

How Building Collapse Risk Is Assessed

Building collapse risk is derived by multiplying the number of buildings tallied by category with the building collapse rate according to ground soil classification.

The building collapse rate was established for each type of building and ground situation based on past studies of damage from earthquakes such as the Great Hanshin-Awaji Earthquake.

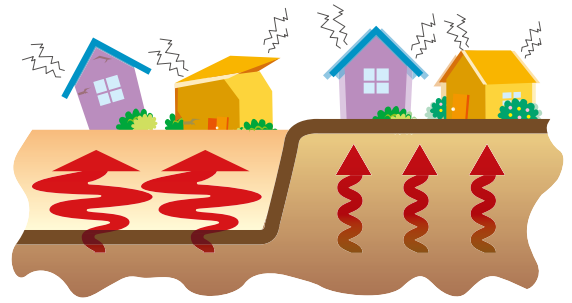
Liquefaction in alluvial lowlands and impact on large built-up areas on hillsides have also been taken into account.



建物倒壊危険度の測定結果

危険度の高い地域は、沖積低地や谷底低地に分類される地盤上にあり、古い木造や軽量鉄骨造の建物が密集している荒川・隅田川沿いのいわゆる下町地域一帯に分布しています。具体的には、足立区南部から荒川区、台東区東部、葛飾区西部、墨田区、江東区北部、江戸川区北西部に広がる地域で危険度が高くなっています。

一方、多摩地域は、区部に比べると危険度が低くなっています。(P9参照)



Results of Building Collapse Risk Assessment

High risk communities are located in areas categorized as alluvial lowlands or valley lowlands, and are found along the “Shitamachi” (downtown) area of Tokyo along the Arakawa and Sumidagawa rivers where there is a concentration of old wooden or light-gauge steel frame buildings.

Specifically, high risks exist for the area from southern Adachi Ward to Arakawa Ward, eastern Taito Ward, western Katsushika Ward, Sumida Ward, northern Koto Ward and northwestern Edogawa Ward.

On the other hand, the Tama area has a lower risk than the ward area. (see p. 9)

Aiming for a Disaster-resilient City

In communities with a high building collapse risk, fears over the collapse of old buildings make it necessary to promote the reconstruction of old buildings while upgrading roads and parks. It would also be important to make seismic assessments of buildings and take measures to retrofit them if necessary.

災害に強い都市を目指して

建物倒壊危険度の高い地域では、古い建物の倒壊が懸念されることから、道路や公園などの整備を進めつつ、古い建物の建替えを進める必要があります。

また、耐震診断を行い、必要に応じて補強するなどの対策を講じることも重要です。

Q. 建物倒壊危険度が下町地域で高いのはなぜですか？

Why is there a high risk of building collapse in the Shitamachi area?

A. いわゆる下町地域（台東、墨田、江東、荒川区など）には、地震の揺れを増幅する軟らかい地盤（沖積低地）が多いことに加え、市街化が早くから進み、古い木造建物が多く存在しています。そのため建物倒壊危険度が高い町丁目が多くなっています。

A large portion of the Shitamachi area (Taito, Sumida, Koto, Arakawa wards, etc.) is ground with soft soil (alluvial lowland), which amplifies the shaking from earthquakes, and in addition to this, because of the early start of urbanization in this area, many old wooden houses exist there. Many communities in this area are thus at high risk of building collapse.

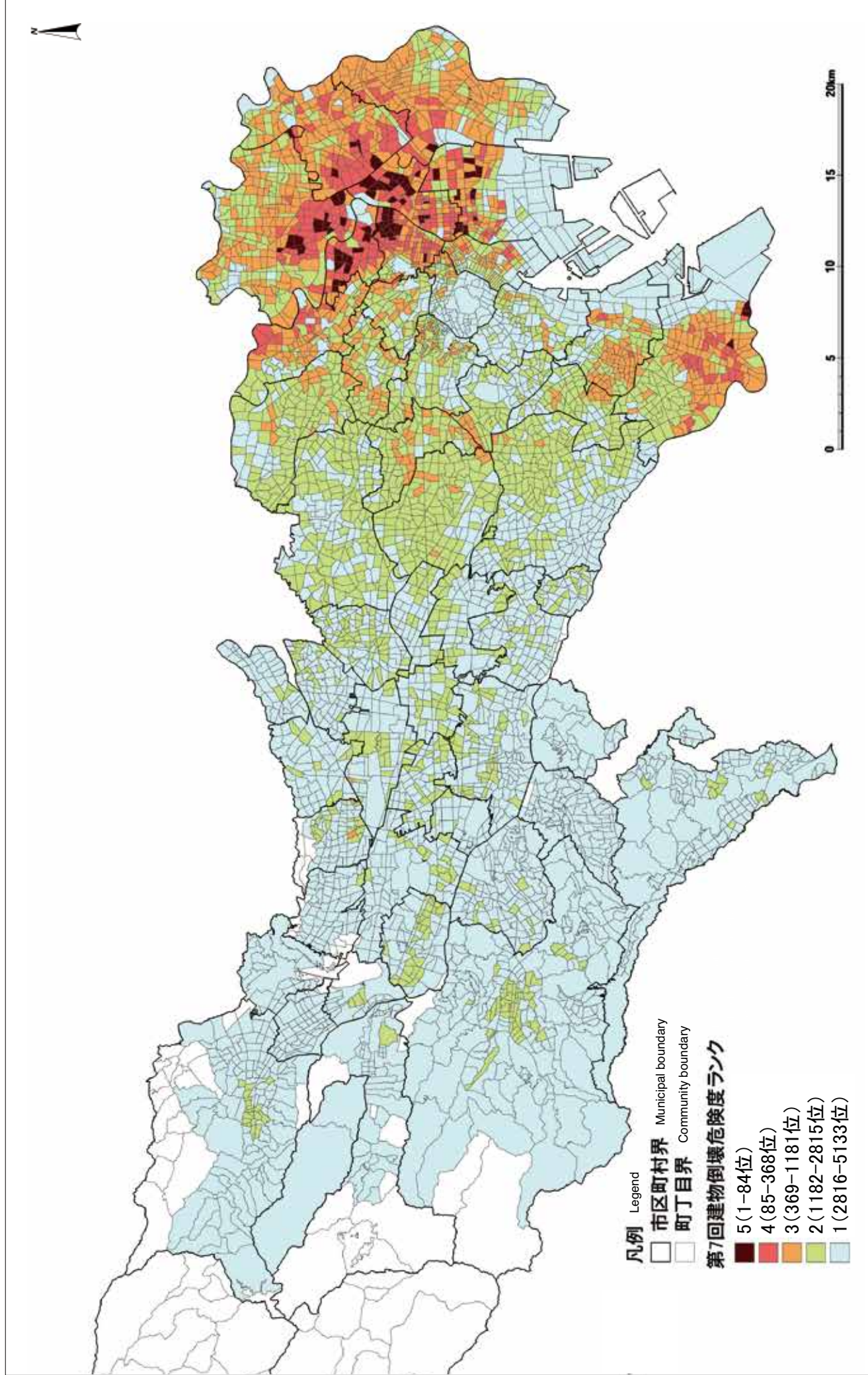
Q. 建物倒壊危険度から見た場合、東京のまちは安全になっていますか？

Has Tokyo become safer from the aspect of building collapse risk?

A. 耐震性の高い建物への建替えや、まちづくりが進んだことにより、建物倒壊危険度は下がっています。

Building collapse risk has declined due to progress made in community design and the rebuilding of structures for higher seismic resistance.

建物倒壊危険度ランク図 Map of Building Collapse Risk Ratings



4. 地震の揺れによる火災の発生と延焼～火災危険度～

Fire Outbreak and Spread Triggered by Earthquake Ground Shaking - Fire Risk -

地震が起こると、地震の揺れで発生した火災の延焼により、広い地域で被害を受ける危険性があります。その危険性の度合いを測定したものが「火災危険度」です。

火災危険度は、出火の危険性と延焼の危険性をもとに測定しています。

出火の危険性

世帯や用途別の事業所の分布状況や火気器具等の使用状況を把握するとともに、火気器具、電気器具、化学薬品などの出火要因別の出火率を算定し、これらを掛け合わせることで測定しました。

延焼の危険性

延焼の危険性は、建物の構造や建物の間隔などから測定しています。

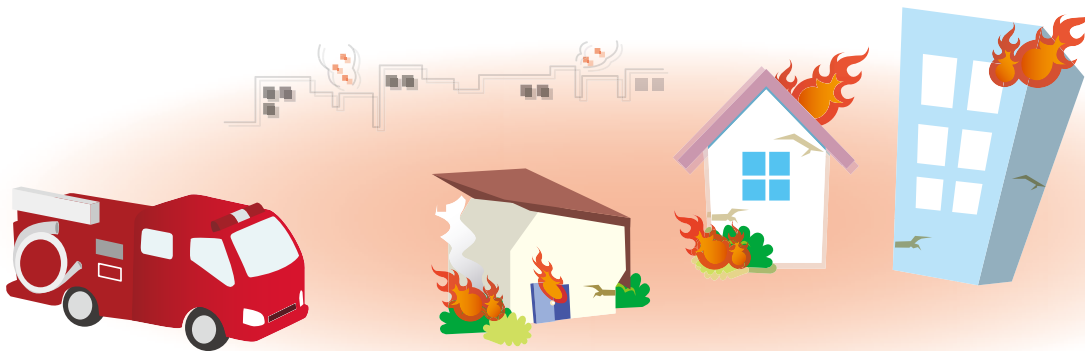
広幅員道路や公園等が少なく、木造建物などが密集している地域では危険性が高く、また、周辺にも同様の特徴を有する町丁目がある場合には、さらに危険性が高くなります。

火災危険度は、東京消防庁による以下の調査結果（データ）を用いて測定しています。

調査結果について詳しくお知りになりたい方は、ご参照ください。

「東京都の地震時における地域別出火危険度測定（第8回）」（平成23年3月）

「東京都の地震時における地域別延焼危険度測定（第8回）」（平成24年3月）



When an earthquake occurs, there is the risk of wide-area damage from the spread of fires breaking out from the shaking. The assessed degree of such risk is called “fire risk.” Assessment of fire risk was based on fire outbreak risk and fire spread risk.

Fire Outbreak Risk

The distribution of households and business establishments classified by building purpose, as well as their utilization of open-flame appliances, was grasped, and along with this the rate of outbreak of fire by source (e.g. open-flame appliances, electrical appliances, chemical agents) was calculated. Fire outbreak risk was assessed by multiplying the two.

Fire Spread Risk

The risk of fire spreading was assessed from building structure, space between buildings, and other factors.

Communities with few wide roads and parks and a high concentration of close-set wooden buildings are at high risk. The risk becomes even higher when neighboring communities have the same features.

Fire risk was assessed using the following survey results (data) by the Tokyo Fire Department. See the following to learn more about the survey results. “8th Tokyo Metropolitan Government Assessment of Fire Outbreak Risk by Area in the Event of an Earthquake” (March 2011) “8th Tokyo Metropolitan Government Assessment of Fire Spread Risk by Area in the Event of an Earthquake” (March 2012)

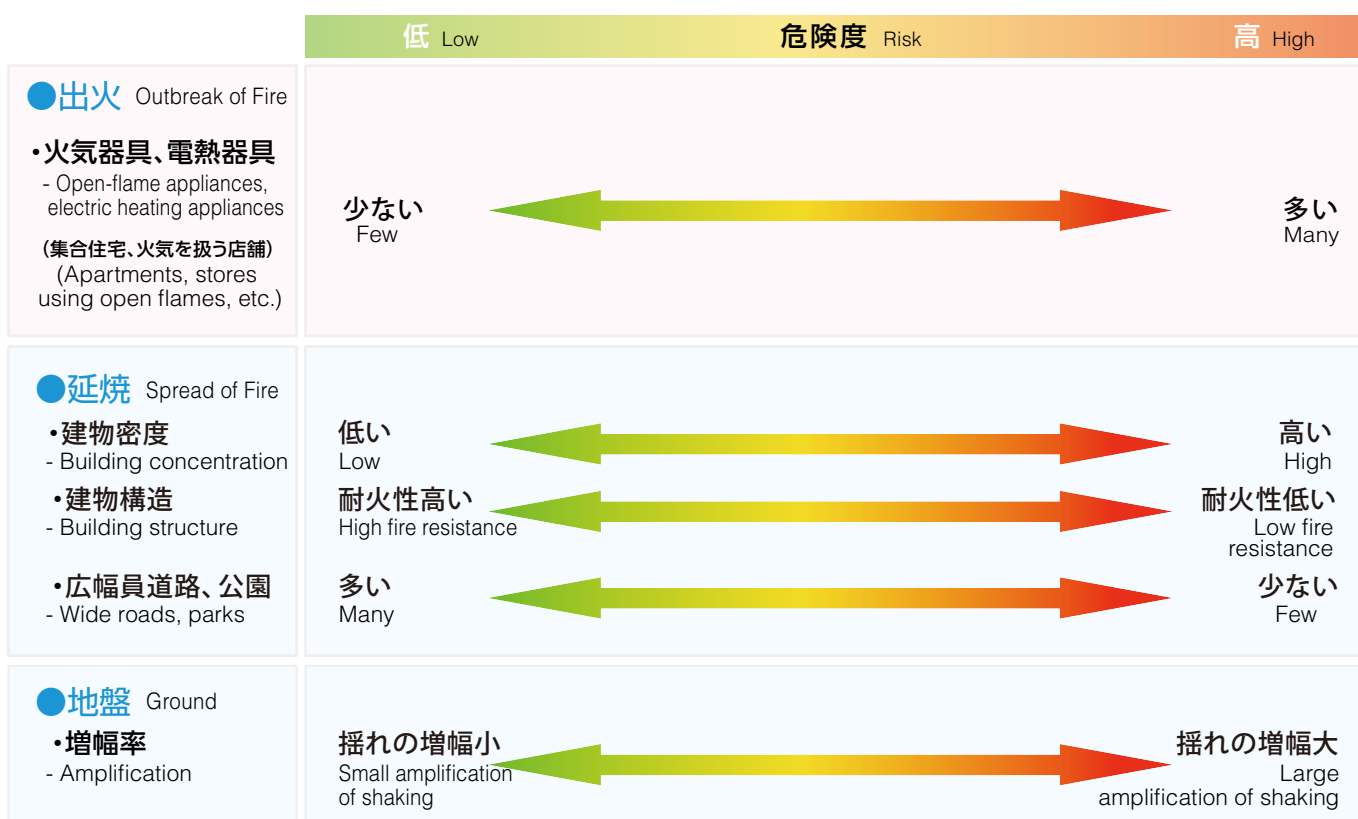


火災危険度の測定方法

火災危険度は、出火の危険性と延焼の危険性を掛け合わせることで測定しています。
また、周辺町丁目からの延焼の危険性も足し合わせて測定しています。

(出火や延焼の危険性と火災危険度の関係)

(Relation between Fire Risk and the Risks of Fire Outbreak/Spread)



火災危険度の測定結果

危険度の高い地域は、木造建物が密集している地域に多く、区部の環状7号線沿いにドーナツ状に分布するとともに、JR中央線沿線(区部)にも分布しています。具体的には、江東区北部から墨田区北部、葛飾区西部、足立区南部、荒川区、北区、台東区東部に広がる地域で、

また品川区南西部、大田区に広がる地域でも危険性が高くなっています。(P13参照)



How Fire Risk Is Assessed

Fire risk is assessed by multiplying the risk of fire outbreak with the risk of fire spread.
The risk of fire spreading from neighboring communities is also added in the assessment.

Results of Fire Risk Assessment

Many communities at high risk exist in areas where there is a high concentration of close-set wooden houses. These are distributed around Ring Road No. 7 in the ward area, and along the JR Chuo line (ward area); specifically, the area from northern Koto Ward to northern Sumida Ward, western Katsushika Ward, southern Adachi Ward, Arakawa Ward, Kita Ward and eastern Taito Ward. The area from southwestern Shinagawa Ward to Ota Ward is also at high risk. (see p.13)



災害に強い都市を目指して

火災危険度の高い地域では、木造建物を鉄筋コンクリート造に建替えるなど建物の不燃化を進めるとともに、延焼を防ぐ広幅員道路や公園などの整備が必要です。

また、住民による初期消火などの出火対策も重要です。

Aiming for a Disaster-resilient City

Communities with a high fire risk must promote the fire-resistance of buildings through improvements such as replacing wooden buildings with reinforced concrete buildings, and constructing wide roads and parks to prevent the spread of fire.

Q. 火災危険度が高い地域の特徴は何ですか？

What are the features of communities with high fire risk?

A. 火災危険度の高い地域は、火を扱う店舗、工場等が多いことや、老朽化した木造建物が密集していること、道路や公園などが少ないことなどの特徴が見られます。

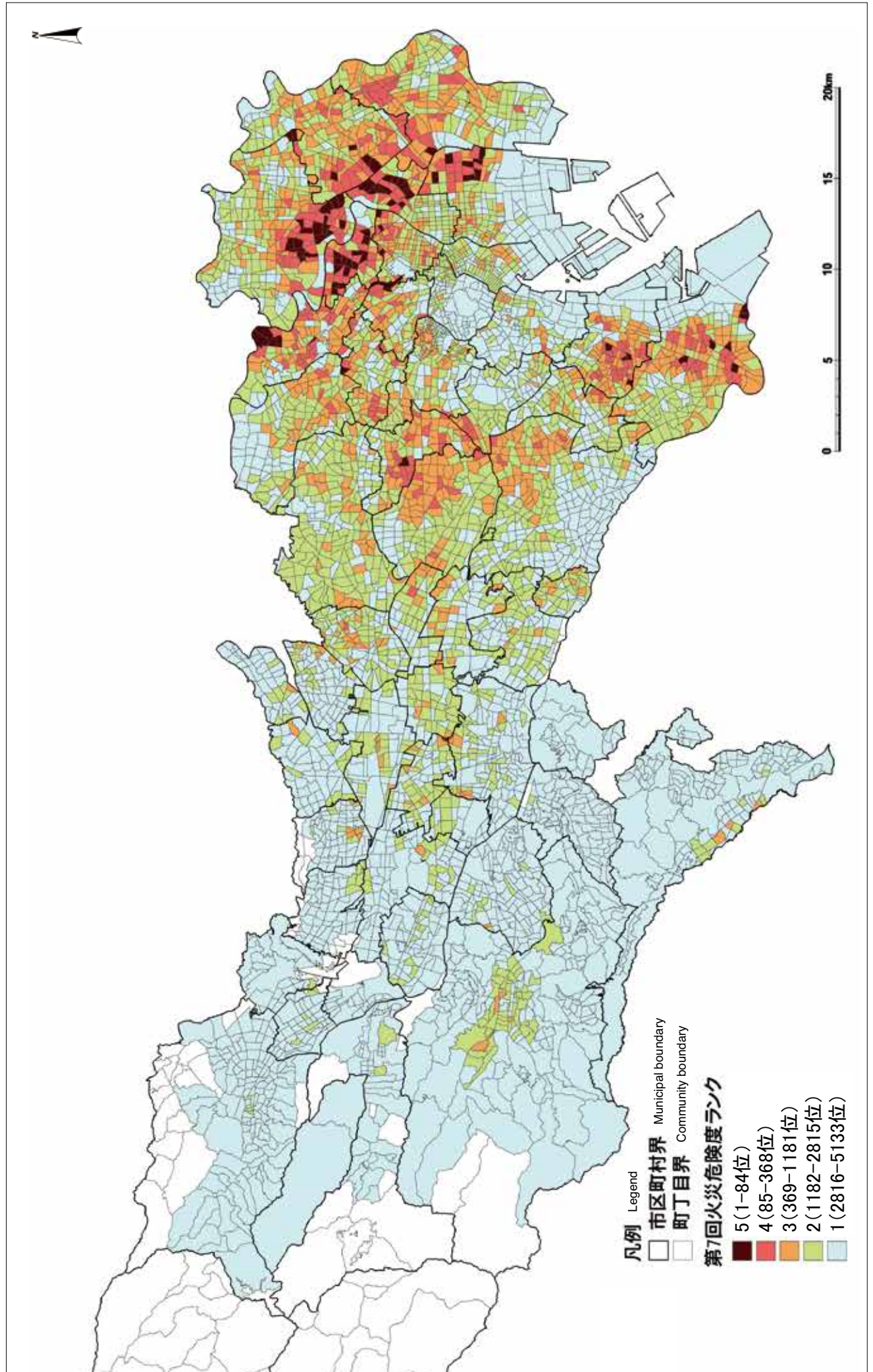
Communities with high fire risk have many stores, factories, and other establishments that use open flames, a high concentration of close-set, old wooden buildings, and few roads and parks.

Q. 火災危険度から見た場合、東京のまちは安全になっていますか？

Has Tokyo become safer from the aspect of fire risk?

A. 広幅員道路や公園などの整備が進んだことにより、延焼の危険性は下がりましたが、一方で世帯数の増加に伴い火気を扱う場所が増える傾向にあり、出火の危険性は上がっています。

Progress made in the development of wide roads and parks has lowered fire spread risk, but fire outbreak risk is increasing with the increase in households and consequently more places using open flames.



5. まちの総合的な危険度 ～総合危険度～

Overall Community Earthquake Risk - Combined Risk -

皆さんのまちの地震の危険性を分かりやすく示すために、地震の揺れによる建物倒壊や火災の危険性を1つの指標にまとめたものが「総合危険度」です。

まちの地震の揺れによる被害や、火災被害の大きさを知るとい視点から、防災都市づくりの指標となるとともに、都民がまちづくりを考える際に、また日頃から地震に備える際に活用されることを想定しています。

総合危険度の測定方法

総合危険度は、町丁目ごとに、建物倒壊危険度と火災危険度の順位(1～5,133位)の数字を合算し、その数値に基づき順位付けを行い、評価しました。

総合危険度の測定結果

総合危険度の高い地域は、建物倒壊危険度、火災危険度ともに高かった荒川・隅田川沿いのいわゆる下町地域一帯に分布しています。具体的には、足立区南部から荒川区、台東区東部、葛飾区西部、墨田区、江東区北部、江戸川区北部に広がる地域で、また、品川区南西部や大田区に広がる地域でも危険度が高くなっています。(P15参照)

To make it easier for residents to understand the level of risk their community faces from an earthquake, building collapse risk and fire risk from earthquake shaking have been combined into one index called "combined risk."

From the perspective of knowing the scale of possible damage to the community from shaking and fires resulting from earthquakes, "combined risk" serves as an indicator for building a disaster-resilient city. It is also hoped that residents will use this in considering community development and in their preparations for an earthquake.

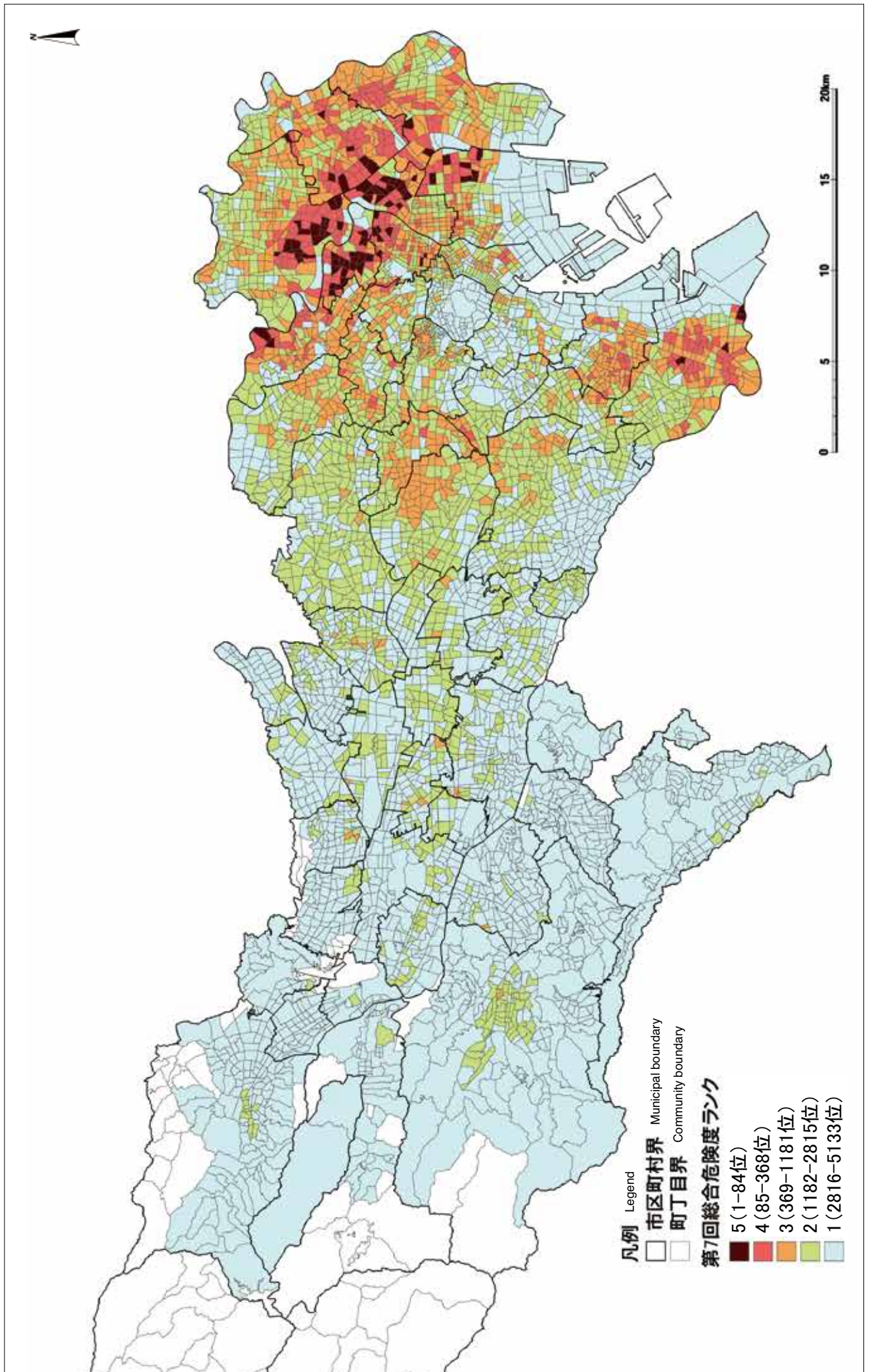
How Combined Risk Is Assessed

Combined risk ratings were determined by aggregating a community's building collapse risk ranking and fire risk ranking (rankings from 1 to 5,133) and then ranking this sum.

Results of Combined Risk Assessment

Communities with high combined risk are found in the Shitamachi area along the Arakawa and Sumidagawa rivers where there was high risk for both building collapse and fire; specifically, the areas from southern Adachi Ward to Arakawa Ward, eastern Taito Ward, western Katsushika Ward, Sumida Ward, northern Koto Ward, and northern Edogawa Ward. The area from south-west Shinagawa Ward to Ota Ward is also at high risk. (see p.15)





6. 道路の整備状況による災害時の活動困難度を考慮した危険度

Risk in Light of Emergency Response Difficulty Based on the Status of the Roadway Network

地震により建物が倒壊したり火災が発生したりした時には、危険地域からの避難や消火・救助活動のしやすさ（困難さ）が、その後の被害の大きさに影響します。このような活動のしやすさ（困難さ）を、地域の道路網の稠密さや幅員が広い道路の多さなど、道路基盤の整備状況から評価した指標が「災害時活動困難度」です。

従来の建物倒壊危険度・火災危険度・総合危険度を、新たに災害時活動困難度を考慮して測定し直すことにより、災害時の活動しやすさを加味した地域の危険度を評価しています。

災害時活動困難度の測定方法

幅員6m以上の道路まで到達するのにかかる平均的な時間と、幅員4m以上の道路から容易にアクセスできない範囲が町丁目面積に占める割合を掛け合わせた値に基づき測定しました。

When buildings collapse or fires break out from an earthquake, how easy (or difficult) it is to evacuate from the stricken areas or to conduct firefighting and rescue activities will affect the scale of further damages. "Emergency response difficulty" is an index of the ease or difficulty of such operations based on assessments of the existing road infrastructure including the density of the road network and the number of wide roads. By reassessing building collapse risk, fire risk, and combined risk by newly considering the difficulty of emergency response, community risk was assessed by taking into account the ease or difficulty of response in the event of a disaster.

災害時活動困難度の測定結果

災害時活動困難度は、全体的な傾向として多摩地域で高く、台東区や千代田区東部、中央区北部などの都心部で低くなっています。（下図参照）

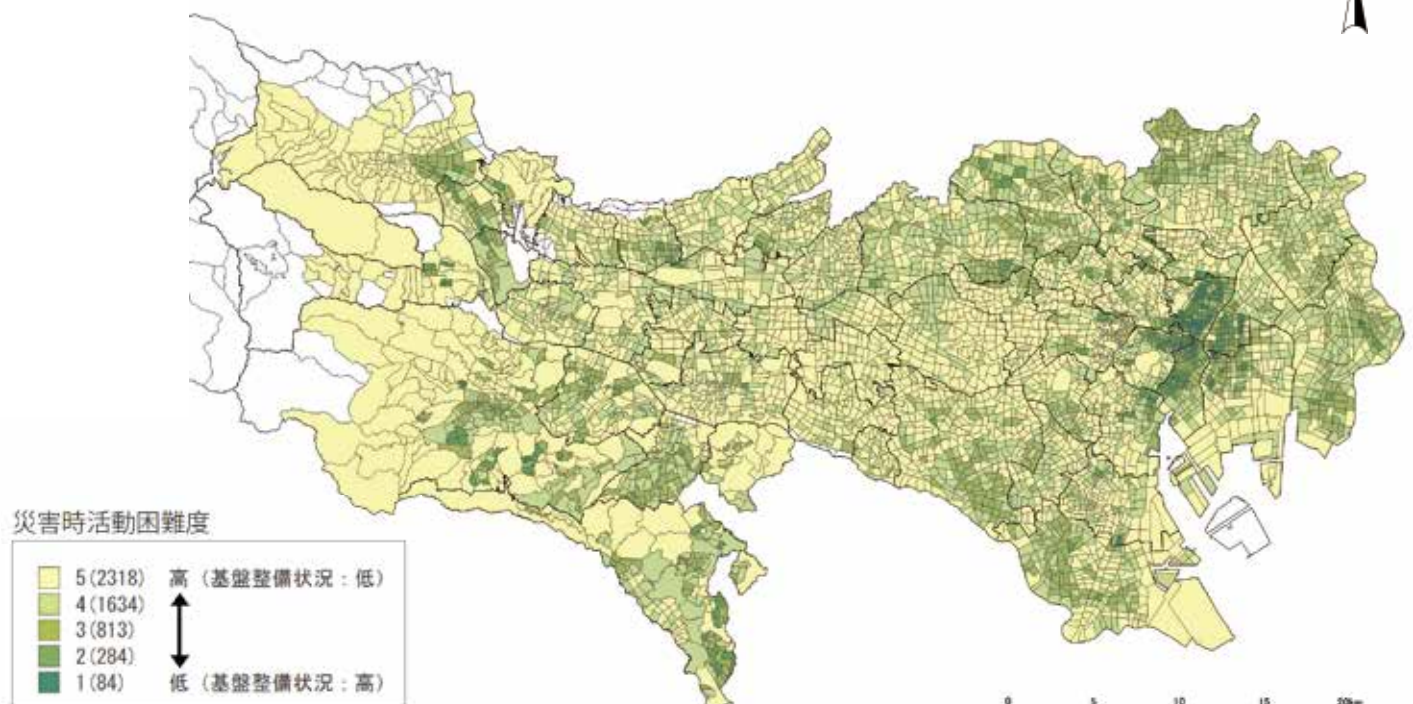
How Emergency Response Difficulty Is Assessed

The index for emergency response difficulty was based on a figure derived by multiplying the average time it takes to reach a road that is at least 6 meters wide by the percentage of the community's area that is unable to easily reach a road at least 4 meters wide.

Results of Emergency Response Difficulty Assessment

There was an overall tendency for the Tama area to have high emergency response difficulty and for Taito Ward, eastern Chiyoda Ward, northern Chuo Ward and other parts of central Tokyo to have low emergency response difficulty.

災害時活動困難度ランク図 Map of Emergency Response Difficulty Ratings





～災害時活動困難度を考慮した建物倒壊危険度と 災害時活動困難度を考慮した火災危険度～

- Building Collapse Risk and Fire Risk in Light of Emergency Response Difficulty -

「災害時活動困難度を考慮した建物倒壊危険度」は、倒壊した建物からの避難や救助活動に関わる危険度です。

「災害時活動困難度を考慮した火災危険度」は、火災が発生した建物の消火や救助活動に関わる危険度です。

測定方法

町丁目ごとに、建物倒壊棟数又は全焼棟数を面積で割り、災害時活動困難度を掛け合わせた値として測定しました。

“Building collapse risk in light of emergency response difficulty” is risk associated with evacuation and rescue operations from collapsed buildings.

“Fire risk in light of emergency response difficulty” is risk associated with extinguishing fires and conducting rescue operations from buildings that have caught fire.

Assessment Method

The number of buildings that will collapse or be totally destroyed by fire in a community was divided by the community’s area, and the resulting quotient was multiplied by the index of emergency response difficulty.

測定結果

災害時活動困難度を考慮した建物倒壊危険度・火災危険度は、木造建物が密集し、かつ道路基盤整備が進んでいない地域で高くなり、環状七号線沿いの下町地域から山の手地域にかけてドーナツ状に分布しています(18ページ参照)。

Assessment Results

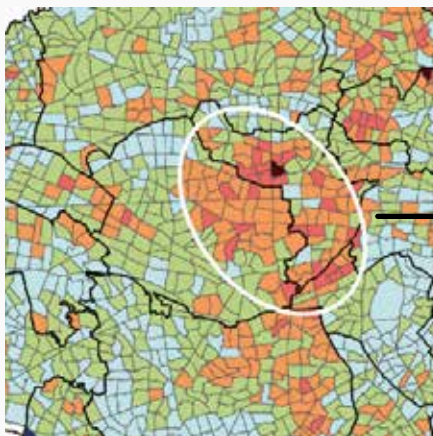
Building collapse risk and fire risk in light of emergency response difficulty were high in areas with a high concentration of close-set wooden houses and underdeveloped road infrastructure. These areas were distributed around Ring Road No. 7 from the Shitamachi to Yamanote areas. (see p.18)

Q. 災害時活動困難度を考慮すると、危険度はどのように変わりますか？

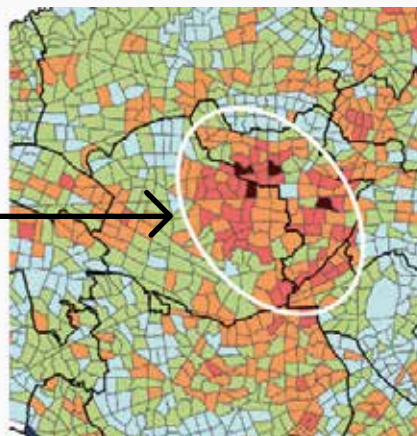
How does risk change when difficulty of emergency response is factored in?

A. 建物倒壊危険度や火災危険度では危険度ランクがあまり高くない地域でも、道路整備が進んでいない場合には、災害時に活動し難い（災害時活動困難度が大きい）ため、危険度ランクが高くなります。具体的には、杉並区、中野区周辺などの火災危険度です。

Risk will increase for even those areas that do not rank that high in building collapse or fire risk if the road infrastructure is underdeveloped, as this will make emergency response difficult (high emergency response difficulty). A concrete example is the increase in fire risk around Sugunami and Nakano wards.



火災危険度ランクの分布
Distribution of communities by fire risk rating



災害時活動困難度を考慮した火災危険度ランクの分布
Distribution of communities by fire risk rating in light of emergency response difficulty



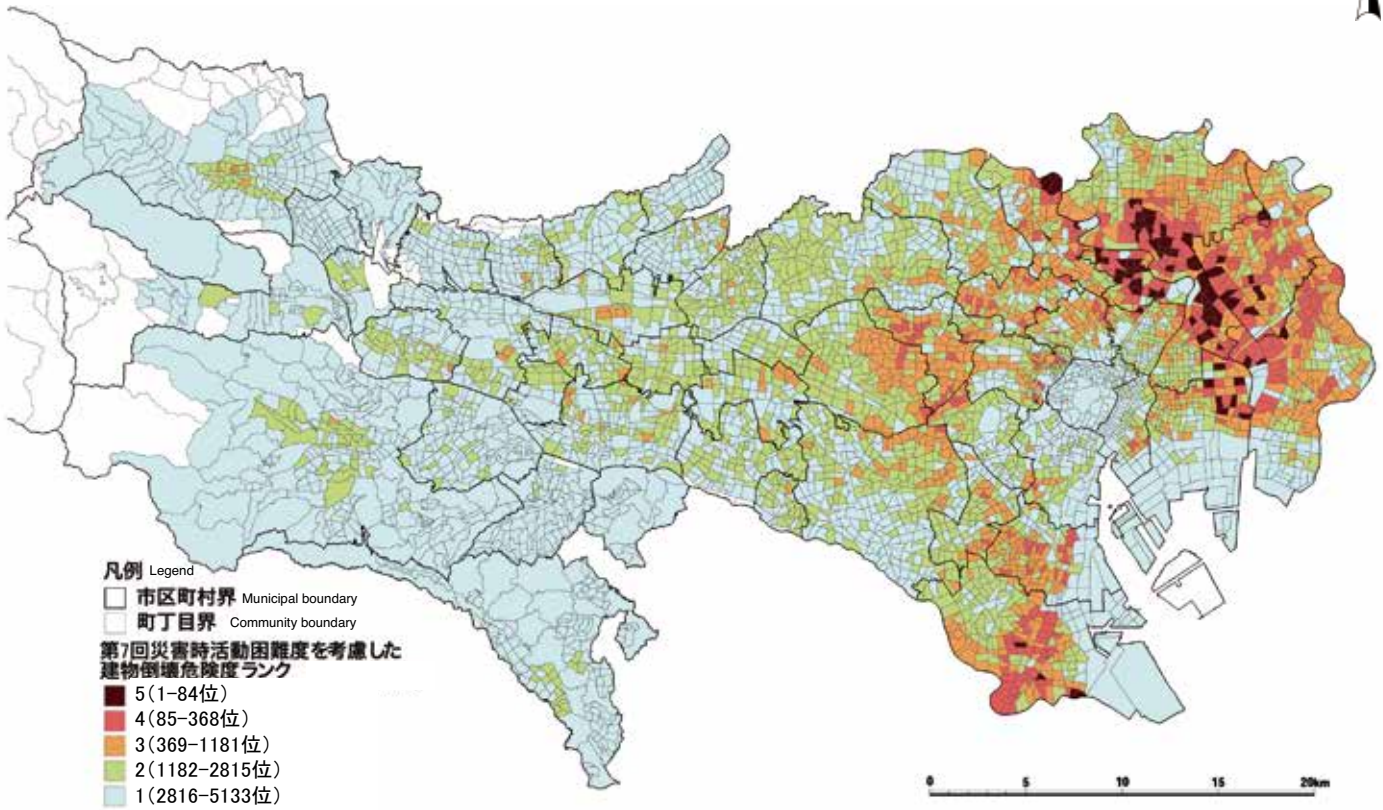
道路整備が進んでいない地域では、危険度ランクが上がる

Communities with underdeveloped road infrastructure have a high risk rating



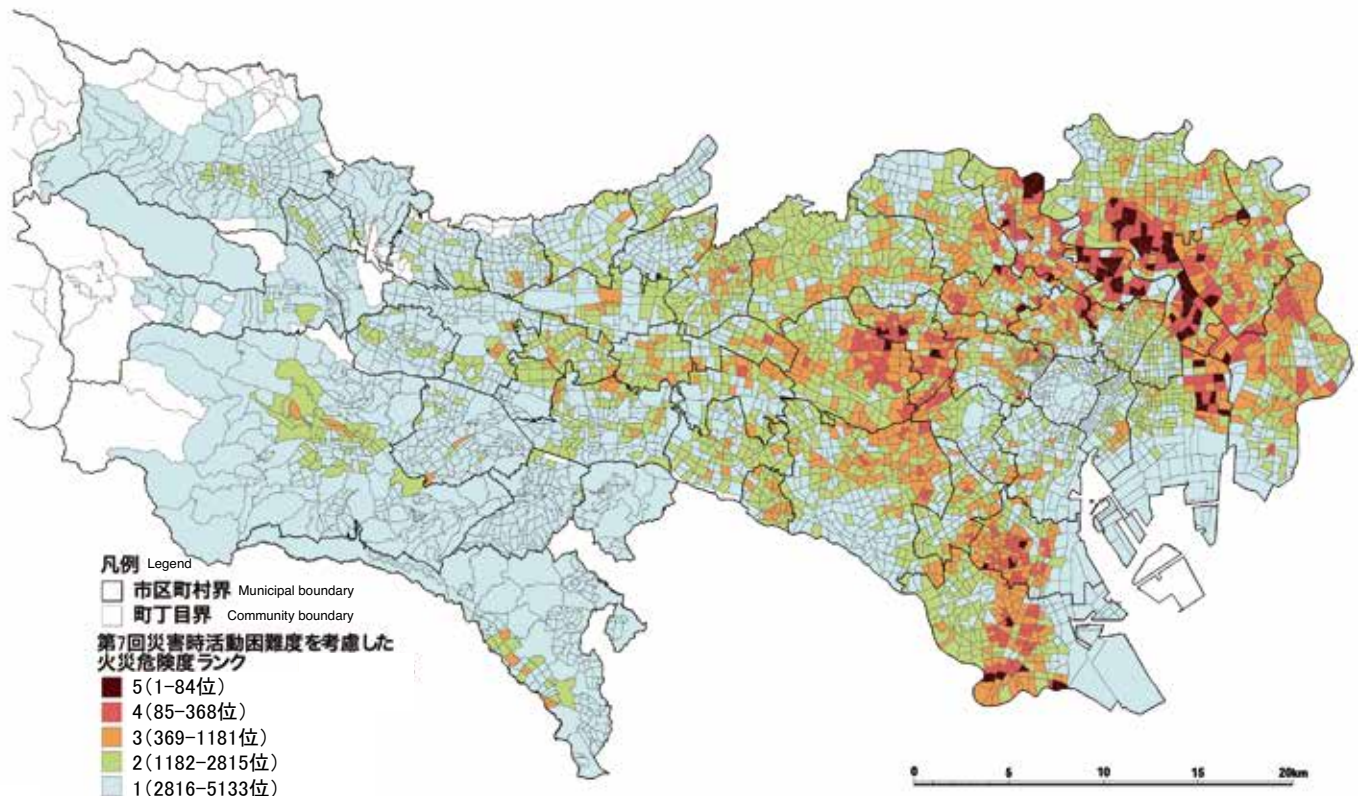
災害時活動困難度を考慮した建物倒壊危険度ランク図

Map of Structural Collapse Risk Ratings in Light of Emergency Response Difficulty



災害時活動困難度を考慮した火災危険度ランク図

Map of Fire Risk Ratings in Light of Emergency Response Difficulty



7. 災害時活動困難度を考慮したまちの総合的な危険度

Combined Risk in Light of Emergency Response Difficulty

皆さんのまちの地震の危険性を分かりやすく示すために、地震の揺れによる建物倒壊や火災の危険性に、避難や消火・救助など、各種の災害対応活動の困難さを加味して一つの指標にまとめたものが「災害時活動困難度を考慮した総合危険度」です。

災害時の避難や消火・救助活動などを支援する空間として、道路が重要な役割を果たすという視点から、防災都市づくりや道路整備の指標となるとともに、都民がまちの地震災害への対応のしやすさ（困難さ）を考え、地震に対する備えに活用されることを想定しています。

災害時活動困難度を考慮した総合危険度の測定方法

災害時活動困難度を考慮した総合危険度は、町丁目ごとに、地震の揺れによる建物の倒壊や火災の危険性の度合いに、避難や消火・救助など、各種の災害対応活動の困難さを加味した「災害時活動困難度を考慮した

建物倒壊危険度」と「災害時活動困難度を考慮した火災危険度」の順位の数字を合算し、その数値に基づき順位付けを行い、評価しました。

災害時活動困難度を考慮した総合危険度の測定結果

総合危険度の高い地域は、建物倒壊危険度、火災危険度ともに高かった荒川・隅田川沿いのいわゆる下町地域一帯に分布しています。

具体的には、足立区から荒川区、葛飾区西部、墨田区、江東区北部に広がる地域で、また、品川区南西部や北

区北部から豊島区北部に広がる地域でも危険度が高くなっています。

さらに、道路整備状況を考慮した結果、木造建物が密集している環状七号線沿いの中野区や杉並区にかけても、危険度の高い地域が分布しています。（P21参照）

災害に強い都市を目指して

総合危険度の高い地域では、建物の建替えによる耐震性の向上や不燃化をはかるとともに、道路、公園などの整備を進めるなど、周辺町丁目も含めて、様々な震災対策を重層的、総合的に進めていく必要があります。

なかでも、災害発生時の避難や消火・救助活動を支える道路の整備は重要です。

また、いつ起こるかも知れない地震に対しては日頃からのまちづくりや対策と備えが重要です。

To make it easier for residents to understand the level of risk their community faces from an earthquake, building collapse risk and fire risk from earthquake shaking have taken into account the difficulty of emergency response such as evacuation and firefighting/rescue activities, and these have been combined into one indicator called “combined risk in light of emergency response difficulty.”

From the perspective that roads serve an essential role as space to support evacuation and firefighting/rescue in a disaster, “combined risk in light of emergency response difficulty” will serve as an indicator for building a disaster-resilient city and road development, and it is also hoped that residents will use this to consider the ease or difficulty of response to earthquake disasters in their community and make preparations accordingly.

How Combined Risk in Light of Emergency Response Difficulty Is Assessed

Combined risk in light of emergency response difficulty was assessed by aggregating the degree of building collapse or fire risk due to earthquake shaking and the ranking of “building collapse risk in light of emergency response difficulty” and ranking of “fire risk in light of emergency response difficulty.” The community was then ranked and rated according to this figure.

Results of Combined Risk in Light of Emergency Response Difficulty Assessment

Communities with high combined risk are found in the Shitamachi area along the Arakawa and Sumidagawa rivers where there was high risk for both building collapse and fire; specifically, the areas from Adachi Ward to Arakawa Ward, western Katsushika Ward, Sumida Ward, and northern Koto Ward. The southwest portion of Shinagawa Ward and the area from northern Kita Ward to northern Toshima Ward are also at high risk.

In addition, when the road situation was taken into consideration, communities at high risk were also found in the area from Nakano Ward to Sugunami Ward along Ring Road No. 7, which has a high concentration of close-set wooden houses. (see p.21)

Aiming for a Disaster-resilient City

Along with promoting the reconstruction of buildings for improved earthquake resistance and fire-resistance, various multilayered and comprehensive measures, including the development of roads and parks, must be promoted within areas at high risk and their neighboring communities. The development of roads that support evacuation and firefighting/rescue activities in the event of a disaster is particularly important.

As an earthquake can strike at any time, it is also essential to always be prepared for one by promoting community development and relevant countermeasures.





Q. 今回調査の結果、前回調査（5年前）より危険度ランクが大きく下がった地域がありますが、その理由はなんですか？

Why did the risk ranking of some communities improve substantially from the previous study of five years ago?

A. 町丁目ごとにランク変動の理由は異なりますが、今回の調査では、

- ・ 市街地再開発事業などによる災害に強い市街地の整備
- ・ 街路事業による延焼遮断帯の整備
- ・ 建物の建替えによる不燃化の促進

などによる市街地の改善が防災性の向上に大きく貢献していることが明らかになりました。

例えば、下図の豊島区東池袋四・五丁目地区では、道路整備と一体的に進める沿道まちづくり事業により、木造建物の割合が下がり、前回（第6回）調査時点と比較し、火災危険度ランクが東池袋四丁目では3から2、東池袋五丁目では5から4へ改善されました。



平成13年度時点（2001）



平成23年度時点（2011）

凡例	Legend
耐火構造	Fireproof structure
準耐火構造	Semi-fireproof structure
防火構造	Fire prevention structure
木造	Wooden structure
道路	Road
公園・運動場等	Park, athletic field, etc.

Although the reasons vary from community to community, this study revealed that improvement of urban zones through development of disaster-resilient zones based on urban redevelopment projects; construction of firebreak belts through road development projects; and promotion of fire-resistance through building reconstruction contributed largely to improving disaster resistance.

For instance, in the following 4- and 5-chome districts of Higashi-Ikebukuro, Toshima Ward, the percentage of wooden houses was reduced through a roadside community development project implemented together with road development. Compared to the previous study, the fire risk rating of Higashi-Ikebukuro 4-chome was improved from 3 to 2, and from 5 to 4 for Higashi-Ikebukuro 5-chome.

Q. 区市町内での危険度の評価をしたいと思いますが、できますか？

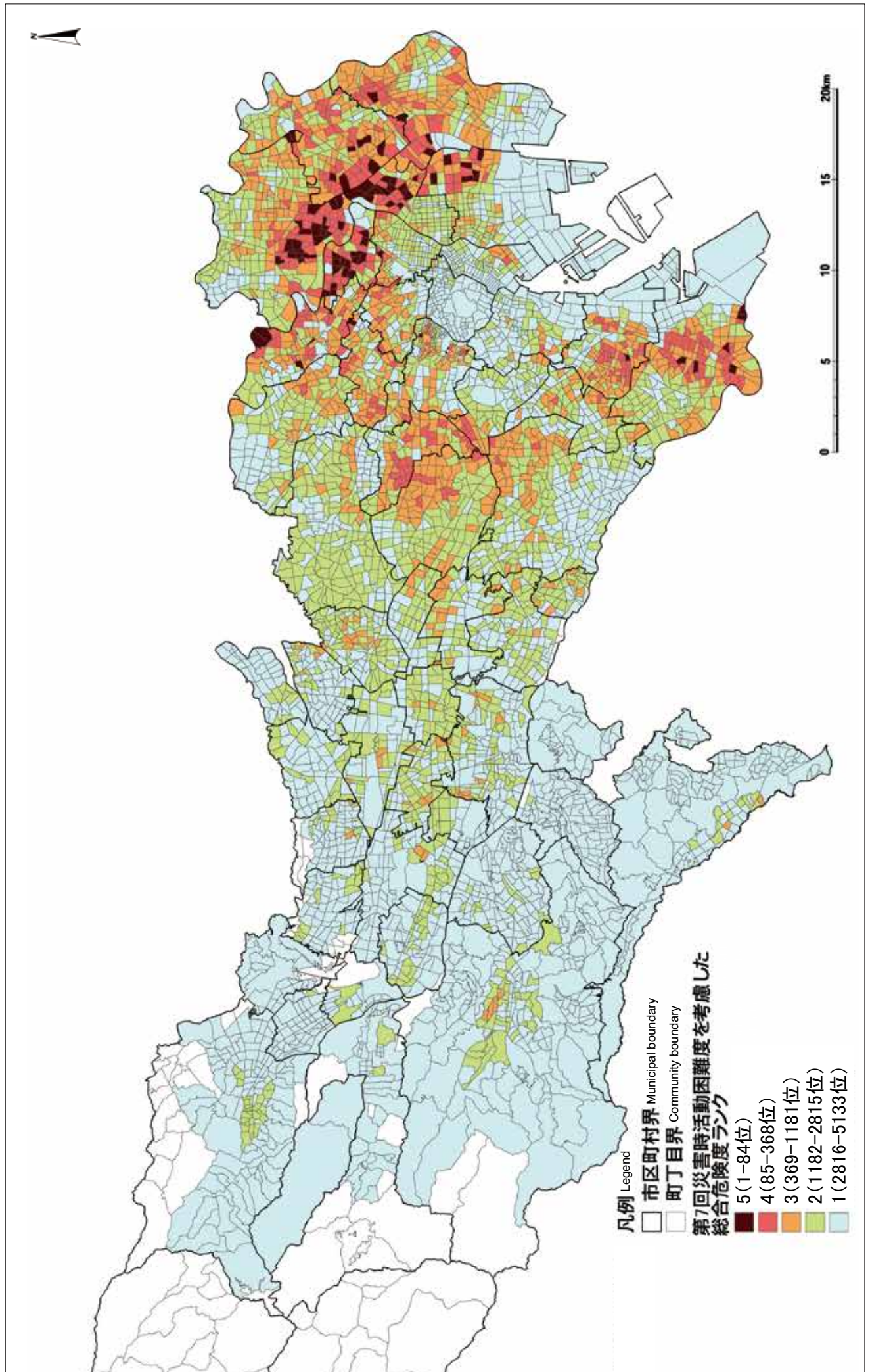
Is it possible to assess the risk of a municipality?


A. 地域危険度は都市整備局のホームページで公表しています。区市町内の町丁目の順位により、評価することは可能です。区市町ごとの特性を考慮して、地域危険度の測定結果を有効に活用してください。

Community risk figures are provided on the website of the Bureau of Urban Development, Tokyo Metropolitan Government. The municipality's risk can be assessed through the ratings of its communities. We hope residents will take into account the characteristics of their municipality and make good use of the community risk assessment results.

災害時活動困難度を考慮した総合危険度ランク図

Map of Combined Risk Ratings in Light of Emergency Response Difficulty





あなたのまちの 地域危険度

Your Community's Earthquake Risk



あなたのまちの地域危険度
Your Community's Earthquake Risk
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