

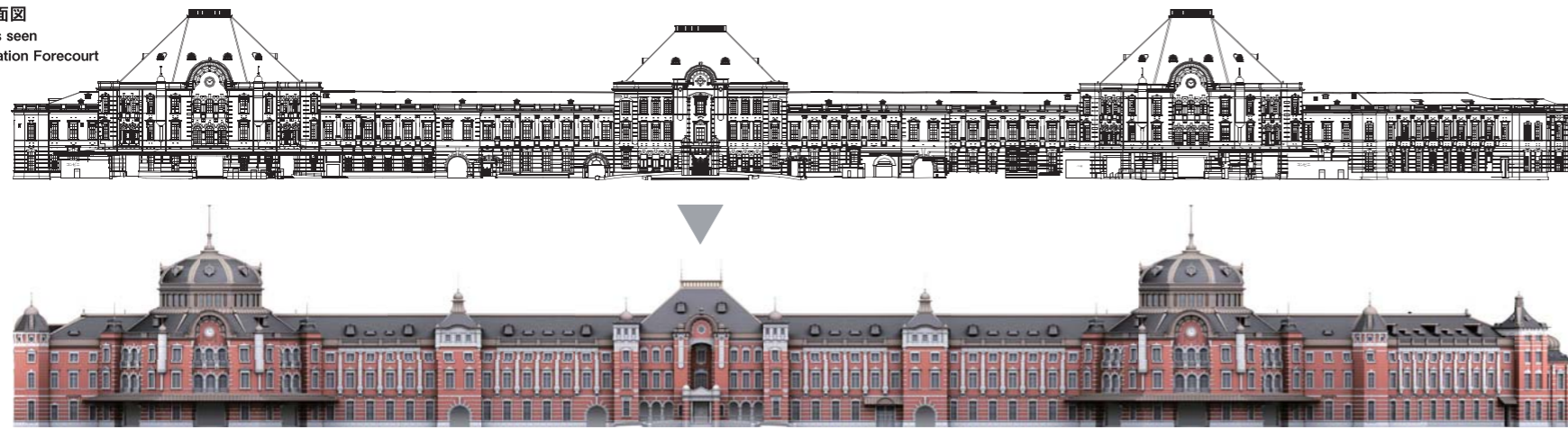
# 丸の内駅舎保存・復原II

## 施設計画 [基本方針]

- 建物の保有する歴史的価値を有効に活かし、創建以来の「駅」「ホテル」としての機能、その後それに加わった「ギャラリー」としての機能を未来へと継承。
- 多様な現代の要求条件に対応するデザイン及び機能、設備を適切に付加し、歴史的建造物の新たな利活用の姿を実現。
- 線路側空間はコンコースとしての有効活用及び丸の内駅舎の機能確保を優先します。そのために適正・有効な範囲・方法で、レンガ壁の改修等現代の駅舎としての空間整備を実施。
- ドーム空間の復原・再生により、内部空間を活性化し、機能性を強化。

## Facility Plan (Basic Principles)

- The inherent historic value of the building will be effectively utilized, while its original function as a station and a hotel, and the later addition of the gallery, will be handed down to future generations.
- We will add adequate designs, functions and facilities to meet the diverse requirements of the present times to use the historic building in new ways.
- Effective use of the concourse and maintenance of the station functionality will have priority for the track-side space of the building. The development of a space to meet the demands of a present-day station was considered and adequate and effective measures were taken in relation to renovation of the brick walls where necessary.
- By restoring and reviving the dome, the interior space was invigorated and its functionality was increased.



工事前  
Design before  
restoration

復原  
Design after  
restoration

■広場側立面図  
Elevation as seen  
from the Station Forecourt

■線路側空間の再生  
Refurbishment of the track-side space



線路側空間は、今までコンコースの壁により遮られていた丸の内駅舎の線路側外観を間近に見ることができます。丸の内駅舎と中央線高架橋の間から外光が差し込み、駅舎とコンコースが一体的で魅力的な空間として生まれ変わりました。

The refurbished trackside space provides travelers with a close view of the trackside exterior wall of the Marunouchi Station Building that previously had been shielded by the concourse walls. Light now shines in from the space between the Marunouchi Station Building and the elevated structure of the Chuo Line, and this has made the building and concourse become an attractive integrated space.

■ホテル計画  
Hotel Plans



丸の内駅舎内のホテルとして、多くの人々に愛されてきた東京ステーションホテルは、規模を拡大し、JRホテルグループを代表するホテルとして生まれ変わりました。

Tokyo Station Hotel, the hotel within the Marunouchi Station Building, is a favorite with many enthusiasts; it has expanded and been reopened as the representative hotel of the JR Hotel Group.

■駅計画  
Station Plans



駅施設は、これまでと同様に丸の内北口・南口・中央口の3つの乗降口とびゅうプラザ、駅長室など事務室が配られました。

As before, there are three entrances, the Marunouchi North, South, and Central Entrances, with View Plaza, the Stationmaster's Office and other administrative offices located on the first floor.

■ギャラリー計画  
Gallery plans



赤レンガの展示室で親しまれてきた東京ステーションギャラリーは、機能をさらに充実させたギャラリーになりました。

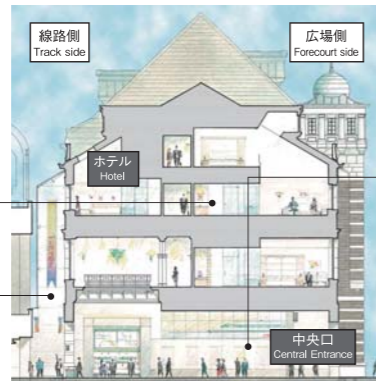
The Station Gallery, also known as the Red Brick Exhibition Room, has been enhanced and now has many added features.

■屋根裏の活用  
Use of the loft area

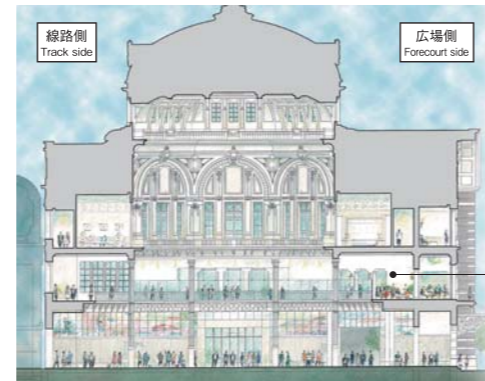


これまで使われていなかった中央屋根裏の空間は、自然光があふれるホテルのゲストラウンジに生まれ変わりました。

The loft area of the central roof, which previously had been unused, has been transformed into a guest lounge for the hotel, bathed in natural light.



施設計画断面イメージ図  
Cross-sectional illustration of the facilities



南北ドーム断面イメージ図  
Cross-sectional illustration of the north and south domes

■ドーム1,2階のデザイン  
Design of the first and second floors of the domes



ドーム1,2階は復原部分の重厚さを残しつつ機能に即した新しいデザインにしドーム見上げ部と調和を図り、ドーム全体として歴史と未来を融合したデザインとしました。

While retaining the dignified style of the restored portions, the first and second floor of each dome were redesigned to meet functionality requirements. Care was taken to coordinate the appearance with the ceiling as seen from below, so as to fully integrate the history and the future into the design.

■線路側立面図  
Elevation as seen from track side





# 丸の内駅舎保存・復原Ⅲ

100年後も安心して利用できる東京駅にするために

東京駅丸の内駅舎保存・復原工事では、免震化工事に4年の歳月をかけています。地下を造るために、335mにおよぶ長大な駅舎のレンガ壁の下に打ち込まれた松杭を撤去し、そのかわりとなる新しい杭を設置して建物を支える工事のためです。松杭の間に打ち込まれた新しい杭の頭をつないで梁を作り、お盆のかたちのマットスラブで建物全体を支えています。

日本ではレンガ造りの歴史的建造物を保存する場合、内側に鉄筋コンクリートの箱をつくって耐震性を確保し、レンガを化粧材として残すという手法が主に採用されてきました。地震国の宿命ですが、ここでは当初のレンガ造りという構造体を保存することにはなりません。東京駅丸の内駅舎保存・復原工事では、創建当初の構造体(レンガ造り)を余すところなく現代の構造体として使用しています。

工事では、レンガ積みの中の壁にある鉄骨の柱と梁を活かす一方、スラブに使用していた石炭ガラコンクリートは耐久性がなくなっていたために撤去しました。ただし、撤去するのはあくまでコンクリートのみ。スラブの中に入っている鉄骨を残し、新しいコンクリートで床を造ることで免震化を実現しました。さらに、十分な耐震性を確保するため、床のスラブの下に壁沿いにコンクリートの添え梁をつくり、これらを一体化させることで耐震補強を行いました。

耐震性の目標は、東日本大震災の揺れでもレンガ壁がひび割れしないこと。極めてまれに発生する大地震にはひび割れまでは許すものの、レンガの落下は生じないようにする。こうした緻密で骨の折れる保存・復原工事の結果、東京駅丸の内駅舎は万全の安全性を確保しています。

As part of the effort to preserve and restore Marunouchi Station Building, four years of work have gone into achieving seismic base isolation. To build the required underground space, first, the pine stakes that had been below the huge 335-meter (1100-feet)-long brick wall of the station building were removed. In their place, new stakes were installed to support the building. These stakes were driven into the spaces between those where the old pine stakes had been. Beams were then used to connect the tips of these stakes into a tray shape, supporting the entire structure in a mat-slab foundation.

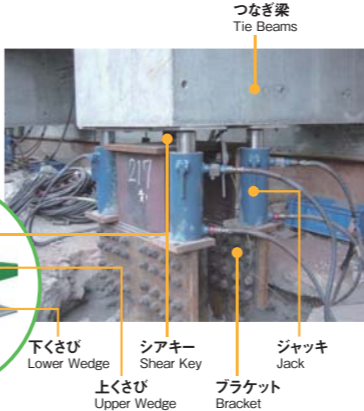
In Japan, when historic brick buildings are preserved, the standard method is to create a reinforced concrete box on the inside, achieving earthquake resistance and leaving the bricks as decoration. Such is the fate of these buildings in an earthquake-prone country, but this is not the same as preserving the original brick structure. The preservation and restoration of Marunouchi Station Building uses the original foundation of the structure (brickwork) as much as possible in the contemporary structure.

During construction, while the steel columns and beams inside the brick walls were being put to use, the worn-out cinder concrete used for the slab was removed. Note that only the concrete was removed. The steel in the slab was retained, and by creating a floor with new concrete, seismic base isolation was achieved. Further, to ensure sufficient earthquake resistance, seismic retrofitting was carried out by putting concrete support beams along the wall under the floor slab and integrating them in the structure.

Here, the goal of achieving earthquake resistance was to ensure that if an earthquake the size of the Great East Japan Earthquake (March 11, 2011) were to occur, the bricks would not crack. In the exceedingly rare case of an even larger earthquake occurring, the bricks might crack but would not topple. As a result of close attention to detail and painstaking preservation and reconstruction work, comprehensive safety has been ensured at Marunouchi Station Building.

- 1) Set up plate with shear key (cylindrical process) beneath tie beam and insert with lower wedge
- 2) Set up jack on prop-side bracket
- 3) Jack up building's weight to transfer it to prop
- 4) Drive in upper wedge
- 5) Remove jack and bracket, completing job

- ① つなぎ梁の下にシアキー(円柱状突起)が付いたプレートを設置し、下くさびで挟み込む
- ② 支柱側のブラケットにジャッキ設置
- ③ ジャッキアップし駅舎荷重を支柱に移す
- ④ 上くさびを打ち込む
- ⑤ ジャッキ、ブラケットを撤去し作業完了。

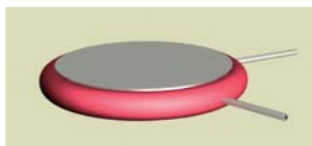


### ■ Seismic Base Isolation

After the underground skeleton was built, a seismic base isolation system was installed. Brick deformation was kept to a minimum through the use of a flat jack, and the weight of the building was completely transferred from the temporary props to the isolator. Finally, the temporary props were removed and the seismic base isolation work was completed.



僅か70cmほどの厳しい作業環境のもと免震化が行われました  
Seismic base isolation work carried out in a daunting work environment only 70 cm (27.6 in) wide



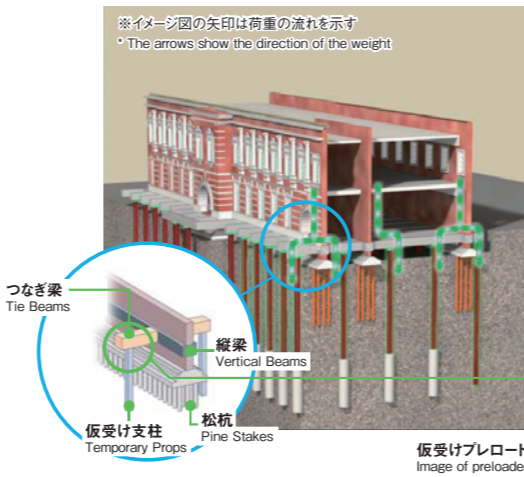
フラットジャッキ  
免震アイソレーターと1階躯体の間に設置。グラウト材を圧入すると厚み3cmが最大5.5cmまで膨らみます  
Flat Jack  
Installed between the seismic isolator and the ground floor skeleton. When grout is pressed in, the 3 cm (1.18 in) thickness is expanded to as much as 5.5 cm (2.17 in).

### ■ Temporary Props

Reinforced concrete skeleton structure. Directly beneath the brick wall, tie beams were created to transfer weight from the vertical beams and the station building to the temporary props.

### ■ 仮受け

RC造躯体構築。レンガ壁直下に「縦梁」と駅舎の荷重を仮受け支柱に伝える「つなぎ梁」をつくりました。



仮受けプレードのイメージ図  
Image of preloaded temporary props

### ■ 免震化

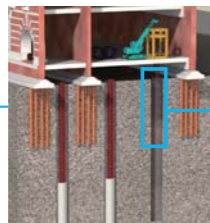
地下躯体の構築後、免震装置を設置。フラットジャッキでレンガの変形を最小限に抑え、駅舎の荷重を仮受け支柱からアイソレーターに完全に移行し、本受けします。最後に仮受け支柱を撤去、免震化が完了しました。



※イメージ図の中の矢印は荷重の流れを示す  
• The arrows show the direction of the weight

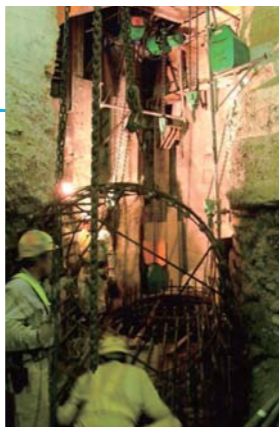
### ■ Stake Driving

Between the roughly 10,000 pine stakes supporting the station building, earth-retaining stakes surrounding the building and about 450 permanent props and temporary props were integrated as supports driven 20 m (66 ft) into the ground.



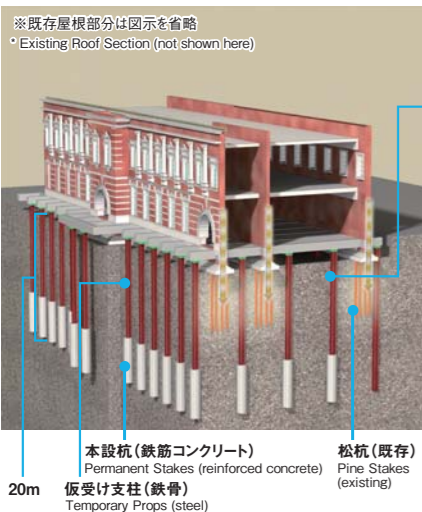
駅舎内は狭所作業のため、鉄骨や鉄筋の部材を何度も継ぎ足す必要がありました。本設杭用の鉄筋カゴを入れる様子(写真右)

As the area for working in the building was cramped, it was necessary to repeatedly extend the steel frame and rebar components. Putting in the rebar basket for the permanent stakes (photo on right)



### ■ 杭打ち

約1万本の松杭が駅舎を支える間に、建物外周の山留め杭と、約450本の本設杭と仮受け支柱が一本化した杭を地中20mまで打ちました。



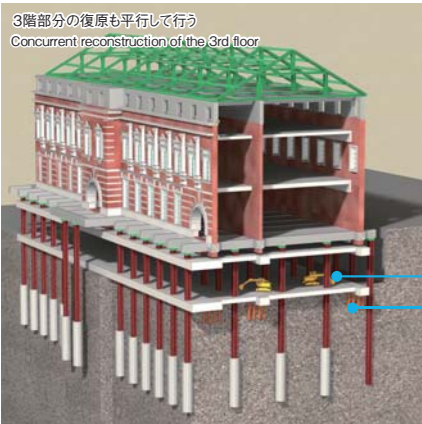
※既存屋根部分は図示を省略  
• Existing Roof Section (not shown here)

### ■ 地下躯体構築

既存の基礎、松杭を撤去しながら逆打ち工法で地上に近い階から地下2階分を構築しました。地上3階部分の復原工事も平行して行いました。

### ■ Underground Skeleton Construction

While the existing foundation (the pine stakes) was being removed, the reverse sheathing method was used to build two levels underground starting with the level closest to the surface. Reconstruction of the 3rd floor above ground was carried out in parallel.



3階部分の復原も平行して行う  
Concurrent reconstruction of the 3rd floor



(上) 地上に近い階から施工  
(下) 松杭を少しずつ撤去  
(Above) Carried out from floor closest to surface  
(Below) Pine stakes removed one by one



免震化計画  
縦梁の構築状況  
Seismic Beam Isolation Plan  
Vertical Beam Construction Status