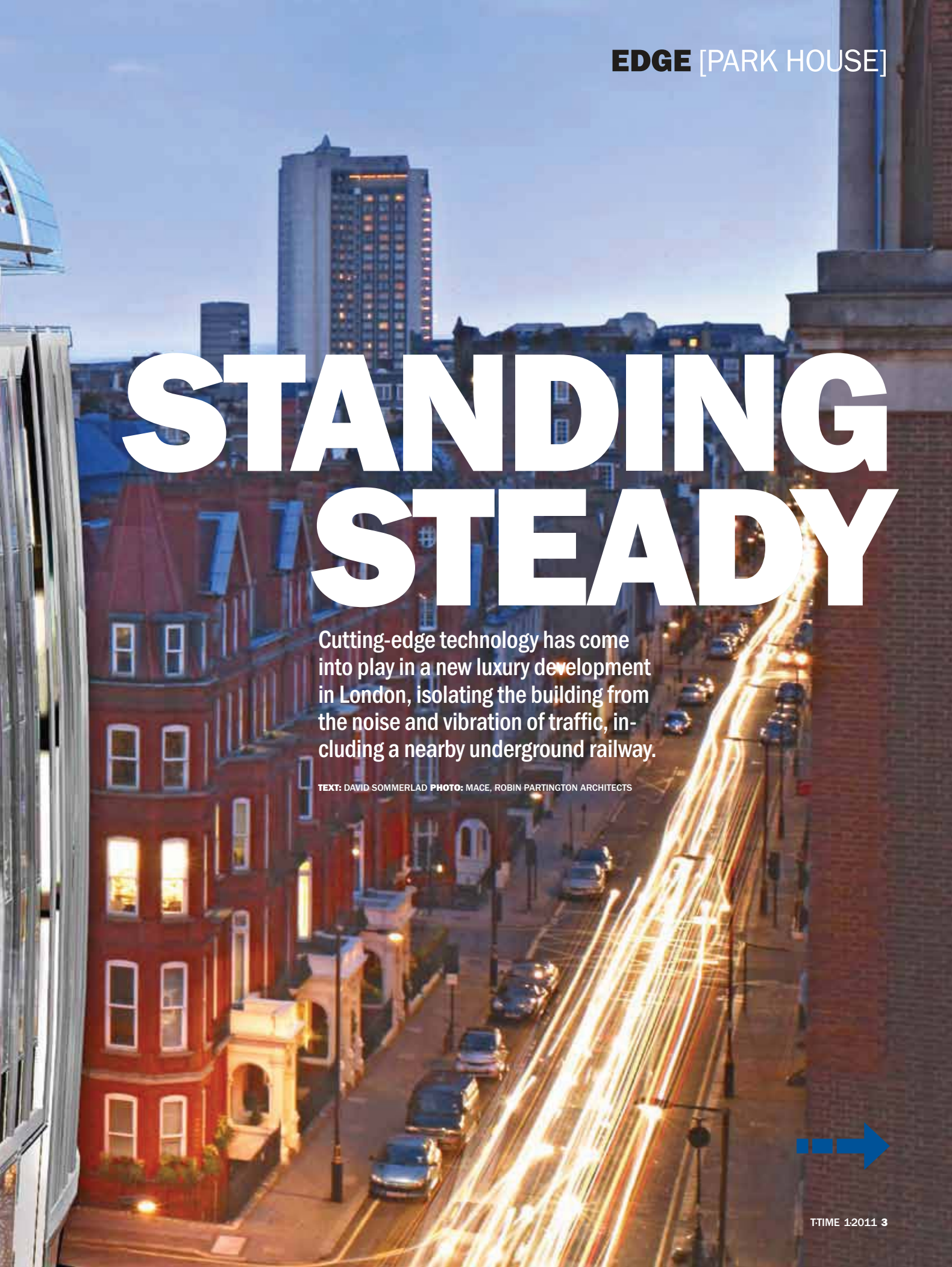
STANDING STEADY

Cutting-edge technology has come into play in a new luxury development in London, isolating the building from the noise and vibration of traffic, including a nearby underground railway.

TEXT: DAVID SOMMERLAD **PHOTO:** MACE, ROBIN PARTINGTON ARCHITECTS



Park House rests on 363 rubber bearings installed at the sub-basement level, under the building's two central cores.

PARK HOUSE

Park House is a new development of retail, commercial and private residential space currently under construction on London's Oxford Street. It will be eight stories high. The first floor will provide 90,000 square feet of premium retail space, the second floor will house 165,000 square feet of offices, and the third floor and above will offer 60,000 square feet of residential space, divided into 39 apartments. These apartments, finished to a very high standard, will provide luxurious accommodation with exceptional views across the capital and easy access to the Central Line Tube.

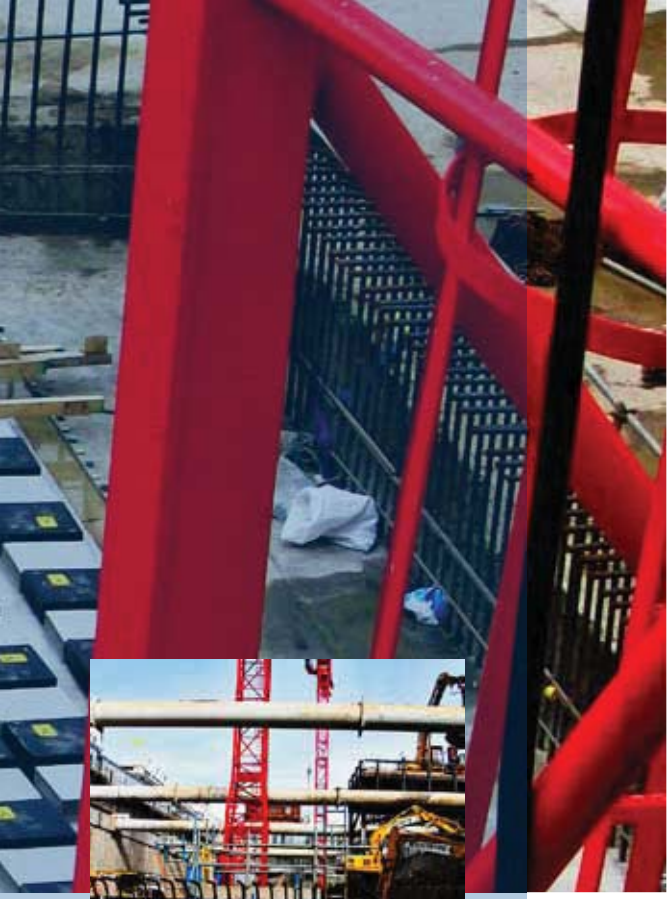
Park House, on Oxford Street in the heart of London's West End, will soon become the address of a mix of luxurious apartments, shops and offices. Construction began in May 2010, and in June the development was bought by Qatar's Barwa Real Estate Company, which has several high-profile properties in London, including Harrods.

The development is valued at GBP 123 million and is the largest to take place on Oxford Street in 40 years. Mace, a leading international consultancy and construction group, is responsible for building the 500,000-square-foot project, designed by Robin Partington Architects.

"Logistically, this is a very difficult site to feed," says Mace Project Manager Paul Fairhurst. "It is what we describe as an 'island' site, with traffic on all sides, and we have restrictions on working hours because of residential premises nearby. Clearing the foundations was quite a challenge. We had to remove 70,000 cubic meters of existing ground in just 16 weeks. This equated to a total of 7,000 truck loads!"

One of the major challenges in the construction is its proximity to Marble Arch Tube Station, part of London's underground rail system, because of vibration and noise from the trains. Acoustic consultants from Hann Tucker Associates were called in at a very early stage, and they invited Trelleborg to join them in formulating a strategy. The two companies have worked together many times to design and supply individually engineered, specially manufactured rubber bearings, which are installed underneath and within buildings to protect them from problems of this sort. Fairhurst had never worked with Trelleborg before but says "very, very few companies in the world can fulfill this type of requirement."

Park House rests on 363 rubber bearings that are 500 millimeters square and 140 millimeters high. The bearings are installed at the sub-basement level, under the building's two central cores – complex towers of steel-reinforced concrete that form



Park House, the largest development on London's Oxford Street for 40 years, will cover an entire city block in Mayfair.

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>
> *Paul Fairhurst, Mace*

the backbone of the building. These bearings carry a 28,000-metric-ton vertical load.

Elsewhere there are three different types of bearing in use, each one individually specified and tested. Ashley Haines, the Trelleborg engineer responsible for the project, described it as "by far the most challenging work I've done in 20 years, involving many thousands of calculations. Moreover, on a practical level, it's vital that the bearings are installed in the correct positions. Each one has to be individually marked and identified, so there is no possibility of mistakes on such a busy construction site."

The highest level of noise and vibration isolation is needed on the third floor, where the luxury accommodation begins. The steel columns here are supported by high-specification bearings included in 44 modular steel assemblies, some of which weigh more than two metric tons.

THE TRELLEBORG BEARINGS

At the Trelleborg Engineered Systems facility in Ridderkerk, in the Netherlands, Trelleborg designs and manufactures engineered rubber products to seal, damp and protect in demanding environments worldwide. As well as isolating buildings, its products are used in bridges, tunnels and harbors and in the oil and gas industry. Structural anti-vibration bearings are individually engineered from laminates of rubber with steel reinforcing plates. The rubber compound, the number of plates and the distance between them are all precisely calculated to meet a particular specification.

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There are bearing assemblies at lower levels to isolate the towers and several hundred smaller bearings, 110 millimeters across, fitted on the second floor to ensure that the exterior cladding cannot transmit vibrations from below.

What Trelleborg brings to the project is its expertise in working closely with specialized structural engineers and acoustic consultants. "Our strengths lie in the ability to provide compact, space-efficient bearings, to take full design responsibility and to offer innovative solutions," says Haines. "In fact, for one of our most complex challenges at Park House, we developed a state-of-the-art solution using specialized 'flat jack' technology to install bearings that will restrain any horizontal forces."

The flat jack technology was originally developed by Freyssinet and used in Park House to aid the installation of the horizontally acting bearings around the perimeter of the two cores. When grout is pumped under pressure inside the jack's circular cavity, the steel casing expands and compresses the bearings. Once the grout has set, the bearings are permanently compressed and able to withstand sideways forces.

The development of Park House was delayed for two years because of the recession. "But now," says Fairhurst, "construction is going well, and we will finish on schedule at the end of 2012." Those people planning to occupy one of the apartments had better start choosing their curtains. ■