



News Release

V&A to stage first retrospective of revolutionary engineer Ove Arup

Engineering the World: Ove Arup and the Philosophy of Total Design

Part of the V&A Engineering Season

18 June – 6 November 2016

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Revealing the untold design stories behind some of the world's most famous buildings, such as the Sydney Opera House and the Centre Pompidou in Paris, to recent projects such as Crossrail, the V&A will stage the first ever major retrospective on Ove Arup (1895-1988), the most influential engineer of the 20th century, as part of the V&A Engineering Season. *Engineering the World: Ove Arup and the Philosophy of Total Design*, staged in cooperation with the global engineering and design consultancy Arup, will survey the life, work and legacy of the firm's Anglo-Danish founder featuring over 150 previously unseen prototypes, models, archival materials, drawings, film and photography, as well as new immersive digital displays featuring animations, simulations and virtual reality.

Ove Arup was the pioneer of a multidisciplinary approach to design that has defined the way engineering is understood and practiced today. His theories on 'Total Design' centred on bringing all professions involved in a project together from the start and also advocated closer collaboration between architects, engineers and builders. Training first in philosophy, and with a highly poetic and imaginative sense of design, Ove revolutionised the fields of civil and structural engineering. Arranged chronologically and spanning around 100 years of engineering and architectural design, the exhibition will present a selection of Arup's groundbreaking projects over the last century, including collaborations with leading architects like Berthold Lubetkin, Renzo Piano, Richard Rogers and Norman Foster. The exhibition will also explore the pioneering work undertaken by Arup worldwide today, including major infrastructure projects like Crossrail, currently Europe's largest underground railway, innovative technologies for acoustics studies like SoundLab®, and SolarLeaf, an experimental bio-reactive façade system that uses microalgae to generate renewable energy. The exhibition will immerse visitors in the creative and collaborative work of engineers, architects and designers who, together, design our buildings, cities and urban systems.

Zofia Trafas White, co-curator of the exhibition, said: *“Ove Arup was the greatest engineer of the 20th century. Unconventional and playful in his approach, his collaborative working style revolutionised building design during his lifetime and influenced how buildings are made today. Ove Arup’s career began at the height of the Modern Movement in the 20th century and went on to last over five decades. The exhibition will paint a picture of the man whose ideas led to the creation of one of the most innovative and influential engineering consultancies working today and will present Arup’s key contributions to almost one hundred years of engineering developments in built environment design. Engineering the World will shed new light on the behind the scenes engineering stories that made possible some of the world’s most iconic buildings.”*

Tristram Carfrae, Deputy Chairman of Arup Group, commented: *“Ove Arup founded our firm with a highly original vision, combining philosophy and engineering to create a holistic approach to design that he called ‘total architecture’. Given the significant challenges the world faces, this pioneering approach to engineering design has never been more relevant than today. For his life and our on-going work to be recognised and celebrated by such a world renowned institution as the V&A is very gratifying. It demonstrates how Ove was a pioneer of his time and how the firm continues to follow his pursuit of creativity and innovation based on world class expertise. The V&A tells this story beautifully and we feel sure this exhibition will be an inspiration to the next generation of engineers, designers and all those interested in the built environment.”*

The exhibition will begin with the section ‘A Portrait of Ove Arup (1895 – 1938)’ revealing him as a philosopher, poet and practitioner, tracing his early career during the burgeoning Modernist design movement and his education in philosophy, mathematics and engineering. It will explore the profound effect Ove’s relocation to London in 1923 had in shaping his understanding of modern engineering practice, through encounters and dialogues with leading Modernist architectural theorists like Walter Gropius, founder of the Bauhaus, and Le Corbusier, as well as his collaborative projects with experimental architects such as Tecton Group and the Modern Architectural Research (MARS) think-tank. Highlights will include technical studies and models for early projects like the Penguin Pool at London Zoo, and a lithograph portrait of Ove Arup by Le Corbusier. Memorabilia from Ove’s personal drawing collection will shed light on his personality, sense of humour and charisma, including his original doodles and doggerel – hand drawn sketches that often accompanied his fanciful poems and notes.

‘Ove and His Firm (1938 – 1988)’ will chart Ove’s career over five decades across the 20th century – a time of great social, political and technological change and the cataclysmic Second World War. Organised around Ove’s own writings on what he called his philosophy of Total

Design, this section of the exhibition will explore the manifesto of guiding principles he created for his firm and the company's evolution into a breeding ground of talent and experimentation.

Ove's contribution to the war effort will be explored, especially his pioneering designs for improving wartime air raid shelters and crucial work on the Mulberry temporary harbours deployed during the D-Day landings in France in 1944, which were built to facilitate rapid offloading of soldiers and cargo. The story of the Sydney Opera House will reveal the key engineering idea that made its completion possible – the first ever application of computer-generated calculations to a building project. The original Ferranti Pegasus computer used by Arup engineers, said to have saved at least ten years of manual calculations, as well as preliminary sketches, technical drawings, models used for stress testing, and previously unseen original calculations for the gravity-defying roof will be shown. A showcase of the Pompidou Centre will explore the Arup engineer team's contribution to the design of the building's most distinctive feature – its external structure and exposed services.

One of Arup's first commissions for an art gallery, the Menil Collection in Houston, Texas, completed in 1986, will show the intuitive approach taken to the design of lighting effects in collaboration with architect Renzo Piano's team. Prototypes of the gallery roof's key 'leaf' reflector panel that enabled a unique daylighting system, which revolutionised atmospheric and lighting standards in art galleries throughout the world, will be displayed alongside an array of test models and study drawings unveiling the evolution of the design. Ove strongly believed that 'design should embody a sensible way of building', and encouraged an approach that united invention with functionality and a respectful use of resources. This section will feature the firm's collaborations with leading emerging architects of the time which pioneered new approaches to construction that are still influential in building design today, including the firm's collaboration with Foster + Partners on the Hong Kong Shanghai Bank HQ, which used unprecedented elements of prefabricated construction, and the Kansai International Airport Terminal Building that united structural design with environmental engineering concerns. The last ever project completed by Ove himself, the Kingsgate Footbridge in Durham, close to his birthplace of Newcastle, will illustrate the essence of his Total Design ideals.

The final section of the exhibition, 'Arup after Ove (1988 – 2016)' will explore Ove's legacy and highlight recent work by Arup to consider the future of cutting-edge engineering solutions and their role in our built environment. Major infrastructure projects such as Crossrail will be brought to life via a new digital interactive map showing underground tunnelling allowing visitors to navigate through London's underbelly. Arup's new technologies for acoustics and environmental sound studies will be showcased through immersive simulations, including a recreation of an Arup SoundLab presenting case studies for concert halls and studies for the

much-debated HS2 railway route. The exhibition will also look at Arup's engineering solutions for open source housing design, including the firm's recent collaborations with Architecture 00 on WikiHouse, as well as innovative crowd flow analysis projects undertaken for cultural attractions around the world, including the V&A.

The exhibition is co-curated by Maria Nicanor and Zofia Trafas White from the V&A's Design, Architecture and Digital department.

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Notes to Editors

- The exhibition *Engineering the World: Ove Arup and the Philosophy of Total Design* runs from 18 June – 6 November 2016. Tickets will go on sale in April 2016. Admission £7 (concessions available). V&A Members go free. Advance booking is advised – this can be done in person at the V&A; online at vam.ac.uk/EngineeringSeason; or by calling 0800 912 6961 (booking fee applies).
- *Engineering the World: Ove Arup and the Philosophy of Total Design* is the headline exhibition for the V&A Engineering Season. The season will feature an ambitious series of displays, large-scale installations, events and digital initiatives dedicated to global engineering design, including the newly-commissioned site-specific garden installation *Elytra Filament Pavilion* by experimental engineer and architect Achim Menges with Moritz Dörstelmann, structural engineer Jan Knippers and climate engineer Thomas Auer.
- The exhibition has been designed by Dyvik Kahlen Architects and Zak Group.
- This is the first major exhibition led by the V&A's new Design, Architecture and Digital department, formed in March 2015.
- Arup are the structural engineers for the V&A's ongoing major Exhibition Road Building Project which will create new state-of-the-art underground galleries, a courtyard and a new entrance.

This exhibition is made possible with the cooperation of Arup

About Arup

Arup is the creative force at the heart of many of the world's most prominent projects in the built environment and across industry. From 92 offices in 40 countries its 12,000 planners, designers, engineers and consultants deliver innovative projects across the world with creativity and passion.

www.arup.com

For further PRESS information about *Engineering the World: Ove Arup and the Philosophy of Total Design* or the V&A Engineering Season please contact Laura Mitchell in the V&A press office on +44 (0) 20 7942 2503 or email l.mitchell@vam.ac.uk (not for publication).

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