

SCAFFOLDING

A part of history

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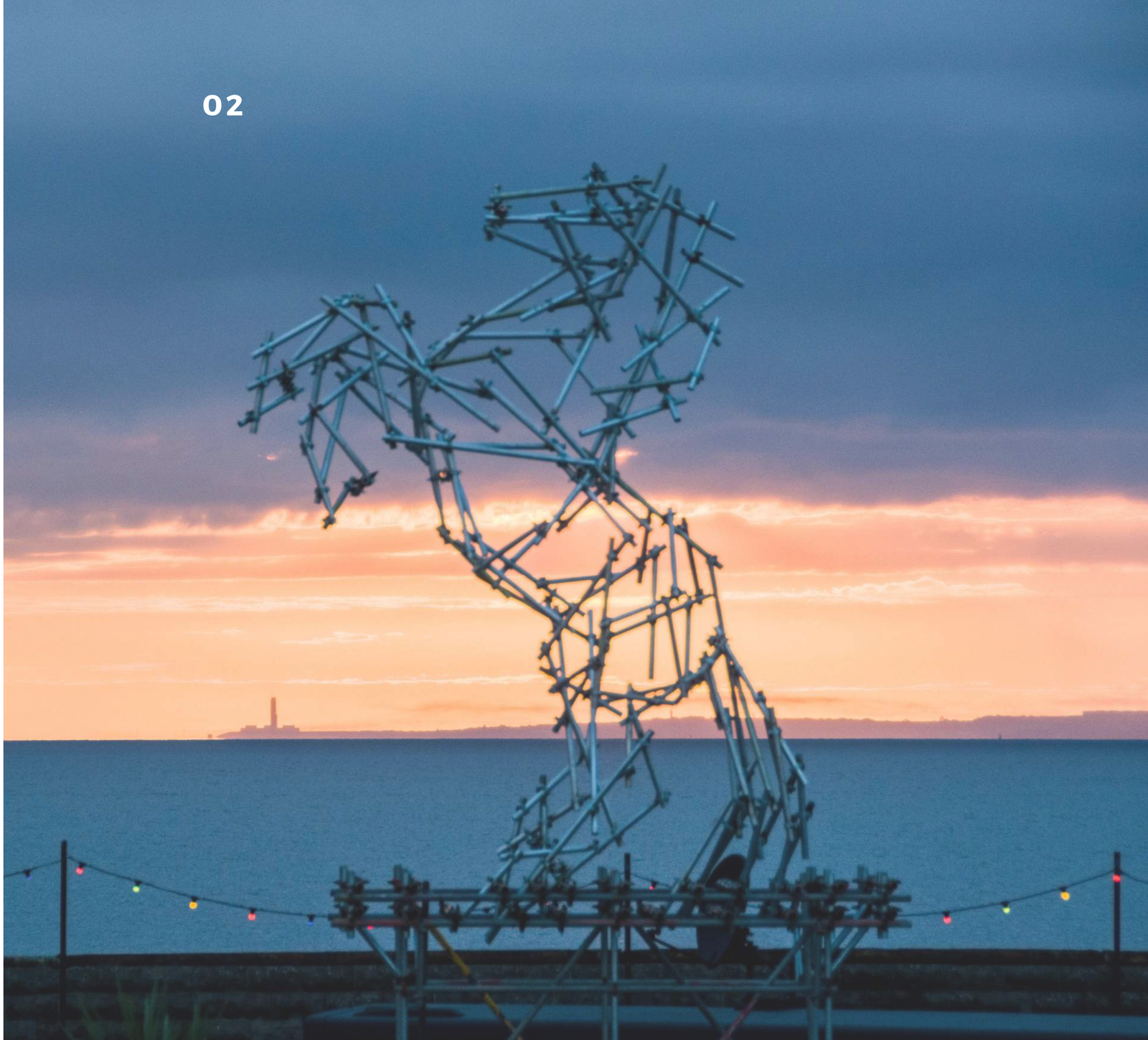
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Scaffolding has been around for over 17,000 years and involved in erecting most of the worlds truly significant structures.

It has played such an essential role in history, but rarely has it taken centre stage.

This book is here to shed a light on how Scaffolding has helped shape our environment today, providing security in creation, allowing the ability to add style to some of the worlds most interesting buildings.

INTRODUCTION

Scaffolding: a part of history

WHERE IT STARTED

Scaffolding is believed to be 17,000 years old, and first used to produce cave paintings on the ceiling at Lascaux (Ancient French Caves).

It was a tradition used by ancient Greece (500 BC), then the Egyptians, copied by the Nubians and the Chinese.

Typically used to build tall buildings, early scaffolding was made of wood and secured with rope.

Even as late as to the 20th Century, there was very little consistency in standards, sizes or methods.

A BRIEF HISTORY LESSON;

Ever wondered where it all began?

Revolutionary Brothers

Daniel Palmer Jones & David Henry Jones revolutionised modern day scaffolding standards, practices and processes; Daniel remains known as '*The Grandfather of Scaffolding*'.

In 1913, Daniel invented and patented the 'Scaffixer' – a robust coupling device used to reconstruct Buckingham Palace.

Modern Day

In 1919, Daniel invented the 'Universal Coupler'. It became the new industry standard and remains so today.

Since then, the introduction of tubular steel water pipes has rendered timber poles redundant and expanded the capability in building designs.

1508

SISTINE CHAPEL

Is scaffolding art?

The Challenge

In 1508, Pope Julius II asked Michelangelo to paint the Sistine Chapel's ceiling – that is over 5,000 sq ft of ceiling at 60 ft high in the air.

The scaffolding had to be:

- High enough that Mass could still be celebrated below without interruption.
- Sturdy enough to hold Michelangelo, his assistants and painting materials.

How it was done

Michelangelo built his own unique scaffolding structure. He designed a wooden platform on brackets built out from holes in the wall near the top of the windows, rather than being built up from the floor – this minimised timber and saved costs.

The scaffolding curved at its top, mimicking the curvature of the ceiling's vault. Only half the building was scaffolded at a time and the platform was moved as the painting was done in stages.

It would take him 4 years to paint the chapel ceiling.

Did you know?

Michelangelo often had to bend backward and paint over his head — an awkward position that caused permanent damage to his vision.

He also fell off the scaffolding and hurt himself so seriously he disappeared for weeks. He dragged himself home and lay in great pain for several days until a doctor came and helped him recover.

1931

EMPIRE STATE BUILDING



The Challenge

The Empire State Building officially opened in 1931, and stood as the tallest building in the world for over 41 years. It took just 410 days to build 103 floors at a height of 1454ft (443m).

How it was done

The scaffolding managed to hold an enormous amount of stress due to the scale of the building.

It was built at a rate of 4.5 floors a week & over 3400 workers clocked up 7 million man hours. It sat on 2 acres, with 10 million bricks, 730 tons of aluminium & stainless steel and 6514 windows building its frame.

Did you know?

The Empire State Building is so big it has its own Zip code.

And it is so tall, it is struck by lightning around 23 times a year.

1986

STATUE OF LIBERTY

The worlds most famous scaffolding



The Challenge

The Statue of Liberty was built in 1875, but underwent a huge 4 year restoration project completed in 1986. The scaffolding stood tall around the exterior for 2 years, and is known as ‘The most photographed scaffolding in history’.

How it was done

The custom-built scaffolding required a 1400ft temporary bridge from Ellis Island for suppliers to access the monument.

The aluminium scaffolding cost $2million and was used inside and outside of the building, consisting of 6,000 pieces & weighing 300 tons.

The scaffolding was erected to enable maximum visibility of the monument, whilst still expected to withstand wind of 100mph; a challenge made harder by the top of the pedestal level required to be free standing for 150 ft – 5 times the usual structural integrity.

Did you know?

Inflation rates means the scaffolding used would cost over $7 million today.

2010

BURJ KHALIFA

Reach for the sky

The Challenge

Officially opened in January 2010, Dubai-based Burj Khalifa is the tallest building in the world.

It stands at 2722 ft (828m), that's 300m taller than its nearest rival and 3 times taller than the Eiffel Tower.

It took almost 6 years to build and reportedly cost $1.5 billion USD.

How it was done

Constructing a build so tall brought unprecedented issues; scaffolding could only be put in place via high-level cranes lifting to the correct floor.



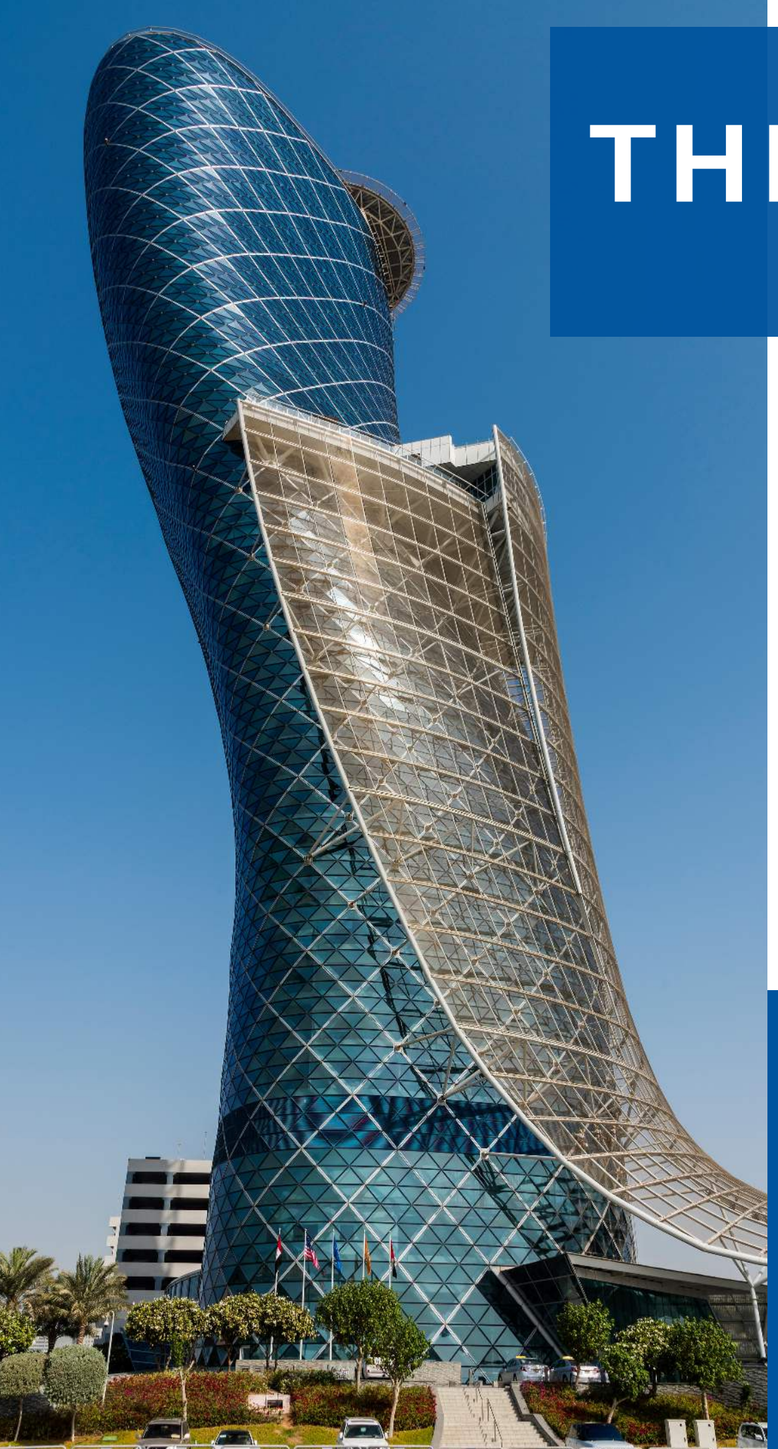
It was built in record time with 1 storey created every 3 days and 175 cladding panels put in place daily.

The end result produced 160 floors, 2,909 steps, 4,500 room keys, 11,000 doors and 25,000 cladding panels and the fastest 2-storey elevator in the world.

Did you know?

Until its official opening day, the Burj Khalifa managed to hide its true height; a feat made easier as the building was constructed floor by floor.

The weight of concrete used is the equivalent of 100,000 elephants.



2011

THE CAPITAL GATE BUILDING

The Leaning Tower of Abu Dhabi

The Challenge

Built in 2011, The Capital Gate skyscraper is known as the Leaning Tower of Abu Dhabi; it is the world’s most tilted building.

At 520 ft (160m) tall it inclines at 18 degrees – almost 5 times more than the Leaning Tower of Pisa.

it took 4 years to build the 35 story structure.

Did you know?

Every single one of the 12,500 triangular panes of glass that create the façade is a different size.

Other buildings constructed using a diagrid approach include London's Gherkin and New York's Hearst Tower.

How it was done

The construction used a variety of cutting-edge approaches to build this unique concept.

It used the world’s first known use of a ‘pre-cambered’ central, vertical core, with steel beams spanning out to connect the internal and external steel diagrid form; this allows for column-free floor spaces.

The building’s floor plates are stacked vertically until the 12th floor, after which point they are staggered over each other by between 300mm to 1400mm.

No 2 vertical or horizontal cross-sections of the building are identical, meaning no 2 rooms in the building are the same.

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2017

BIG BEN

Cover your ears

The Challenge

London’s Big Ben is currently under-going major repair works. The world famous 300ft clock tower is entirely covered in scaffolding and will be for the next 4 years.

How it was done

Restoration works costing up to £61million have begun on the clock, but not without controversy; the bells will not ring as normal during this period – ringing only on special occasions.

The reason: health and safety.

It is reported that those working on the project would be put at serious risk if the bell continued to chime during restoration. Not only could their hearing be impaired by the 118 decibel ‘dongs’ (almost 40% louder than our ears can cope with), but it could also startle the workers on top of the 100m high scaffolding.

Did you know?

Big Ben is the name of the bell in the clock; he is 159 years old and weighs as much as a baby elephant.



So there you have it – a brief look at the construction and restoration of some of the worlds most fascinating buildings and the supporting role scaffolding played.

Whether a structure is big or tall, tilted or awkward in shape, exposed to the elements or in amongst a concrete jungle, scaffolding needs to be flexible, durable and built-for-purpose.

Unlikely to ever be the star of the show, scaffolding will continue to play its part in building upon the practical and stylish environment we live in today.

CONCLUSION

Scaffolding: a part of history

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