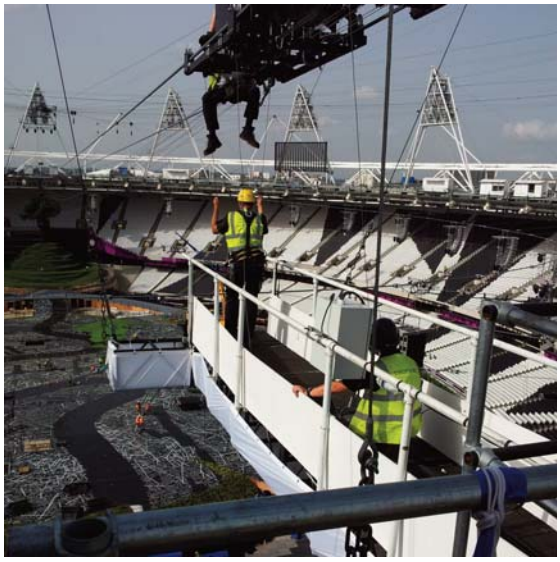
London 2012 Olympic Ceremonies

AERIAL AUTOMATION AND STAGE ENGINEERING: Flying in the Olympic Ring as the chimneys rise.

Client: LOCOG
Creative Director: Danny Boyle
Technical Director: Piers Sheppard

ISLE OF WONDER

Our cablenet system, Qmotion automation and scenery building skills were used to help deliver Danny Boyle's hugely popular, feel-good Opening Ceremony that kicked off the London 2012 Olympic Games. Our involvement in the 2012 Olympic and Paralympic Ceremonies began back in 2009 when we were asked to consult on possible modifications to the stadium roof in order to facilitate the installation of the cablenet, an essential component in realising the creative vision of any stadium based show. Our technical team have extensive experience of developing, installing and operating cablenet systems for ceremonies in stadia throughout the world and have accrued unique and highly specialised knowledge along the way.



IN FOR THE LONG HAUL:
We had crew on site from Dec 2011 till Sept 2012.

AUTOMATION OVER AND UNDER

If it moved over the stage, we flew it and if it emerged from under the stage, we lifted it. Sometimes the visual effects and movement of huge scenic pieces required a combination of the two, with stage engineering working in combination with the aerial automation to achieve an apparently effortless effect.

Working for 2012 Ceremonies Ltd and Technical Director Piers Shepperd, we began installing the cablenet in December 2011, with the stage engineering installation beginning work in May 2012. The London cablenet consisted of 14 radial cables attached to the 'A' frame features on the stadium roof and meeting in a central hub 38 metres above centre stage. Each cable carried two trolleys that could run independently, to which various items of scenery and/or performers could be attached.

Programming and triggering cues was a complex procedure requiring carefully plotted deployments and delays. Different triggering systems were used to run some cues due to the overload of the wireless radio frequency spectrum for the whole ceremony because of the extraordinary demand from broadcast systems and security personnel.






ENGINEERING THE INDUSTRIAL REVOLUTION

The cablenet and our Qmotion controlled automation system was used to fly performers and scenery for key dramatic moments in the ceremony. The transition from 'Green and Pleasant Land' to the 'Pandemonium' segment depicting the Industrial Revolution, was quite possibly the biggest scene change in history. One constant throughout the ceremony was the huge 10 metre waterwheel which survived the transition from the opening pastoral scene through the industrial revolution of Pandemonium when further scenic elements were added – namely the five 10m by 3m beam engines.

Manufactured in 3800mm sections, the 8m diameter wheel of each beam engine had to be light enough to be carried on by the performers and simple enough to fit together on stage amid the noise and live action of the show. Constructed in our workshops they were made from fully recyclable lightweight aluminium frames clad with plywood and given a suitable basic paint finish, before being finished in detail on site by others, giving the appearance of heavy iron and steel. Each device rotated or nodded via concealed chain drives.

The waterwheel was completed in our workshops and given a distressed scenic finish, emerging to look as if it was made from weathered oak and cast iron – complete with touches of verdigris. Although real water passed through the race beneath, the wheel was driven mechanically.

Qmotion played a vital role in delivering the slowly building crescendo of seamless scenic changes, revealing smokestacks, bellows and beam engines where there had been fields and sheep. Our systems in the air and under the stage raised the seven giant chimneys, the tallest of which reached a height of 30m. Although inflatable, each double-skinned chimney still weighed around one tonne and was rolled via tracks underneath the stage onto one of our stage lifts. As the chimneys were simultaneously inflated by fans and pulled skywards by our cablenet system, the stage lift rose, finishing flush with the stage floor as each chimney reached its full height. Convincingly rigid and solid in appearance, steeple-jack performers then 'scaled' the chimney heights.

PRECISION CHOREOGRAPHY: Careful planning and timing were required for the five rings to reconfigure accurately in mid-air.

FORGED OLYMPIC RINGS

We flew in four huge 15m diameter 'molten steel' rings from platforms on the roof, as the fifth freshly 'forged' ring was lifted from the centre of the stadium. These five rings reconfigured in mid-air above centre stage, perfectly choreographed into the iconic Olympic symbol. Occurring at the same time as the raising of the chimneys, this section required careful planning and timing as up to 3.5m of deflection in the aerial cables had to be allowed for due to the changing loads on the aerial system. This process then had to be reversed as the stage area was cleared for the NHS segment of the show.

MULTIPLE MARYS TAKE FLIGHT

Flying in 32 Mary Poppinses required four flying lines, each loaded with eight performers. Descending from platforms on the roof, the Mary Poppins performers flew down into battle with a huge Voldemort puppet, which was also controlled with lines to our aerial system. At the same time, five performers dressed as Dementors took off from the stadium stage floor. All required careful coordination and programming to ensure each performer was kept to within their own 'airspace' and the correct speed of travel was maintained.

The aerial system was used for further elements of the show such as deploying the top half of the house that lifted to reveal British inventor Sir Tim Berners Lee and later, in a unique take on the traditional doves of peace, we launched the lone cycling 'dove' performer into the air.

ABSOLUTE RELIABILITY: The 18m stage lift nicknamed 'Frank', carried the weight of the cauldron on its shoulders.

STAGE LIFTS

The first stage lift to be installed, nicknamed 'Frank', was the huge stage lift designed to lift the Olympic Cauldron. Located in the centre of the stadium, Frank's job was to lift the 16 tonne cauldron 2 metres to the stage, bringing her out of hiding and revealing her to the world at precisely the right moment. Reliability was absolutely essential and our stage engineering team, who are highly experienced in delivering for live ceremonies, were tasked with constructing the largest lift we have ever built. Frank was 18 metres in diameter, weighed 32 tonnes and used eight rams to supply the power via eight lift towers to raise Betty to show position.

We provided a further nine stage lifts, each of which lifted scenic pieces such as the five tonne beam engines or performers.

THE OLYMPIC CAULDRON

Designed by Thomas Heatherwick, this was one of the most complex and unusual devices we have ever built, as well as being one of the most secret projects on which we have ever worked. The design allowed no margin of error and it was important that every detail was carefully considered. We began a process of nine months of development with our CAD team and in our workshops, working closely with the Heatherwick Studios team to achieve the design intent. With the cauldron providing such an important moment, the need for reliability was absolute.

At 16 tonnes and eight and a half metres tall, 'Betty', as she was codenamed, consisted of 204 individual copper petals attached to 204 stainless steel tapered stems, fixed by a series of pivots and fixings to an automated tiered base. Housed discretely under the stage during the stadium fit-up and emerging only for tests during the dead of night, this was a cauldron completely unlike any seen before.

THOMAS HEATHERWICK'S CAULDRON: The perfect union of craftsmanship and creativity, lit by the athletes of the future.

BREATHTAKING FINALE

Each petal, inscribed with the name of the participating nation, was carried into the stadium during the athletes' parade by a representative of each team, the purpose of the petals not being disclosed to anyone before the show, being revealed only at the moment of lighting. The complete and fully assembled cauldron finally made her debut to a TV audience of one billion, being lit by seven young athletes and providing a beautifully symbolic climax to the Opening Ceremony as the copper 'petals' rose into the air, coming together to form a single, united Olympic flame.

Our stage engineering and cablenet were also used during the Closing Ceremony, delivering performers and props on the huge central stage lift; and flying ballerina Darcey Bussell in the guise of a phoenix, from high up near the stadium roof. Together with male principal dancers from the Royal ballet, Bussell performed a dance called 'The Spirit of the Flame' before the cauldron performed its magic in reverse, lowering the 204 stems and petals before the flame was extinguished, marking the close of the London 2012 Olympic Games.