

Introduction

The Olympic Delivery Authority (ODA) was created in April 2006 and will continue to exist until no later than March 2014. It is the public body responsible for developing and building the new infrastructure and venues for the London 2012 Olympic and Paralympic Games and their initial legacy uses after 2012.

ODA's 'big build' work for the games, which took place primarily on the Olympic Park in London, was substantially completed on 27 July 2011 and all permanent venues were handed over to the London Organising Committee of the Olympic and Paralympic Games for testing and commissioning a full year before the opening ceremony.

As described in this second special issue of *Civil Engineering* on London 2012, the programme succeeded in delivering £7 billion of high quality infrastructure and venues on time and under budget – despite an environment of economic downturn, intense external scrutiny and increased security threat. This is a major achievement.

But what are the overall reasons for the programme's success, beyond application of the usual project management 'golden rules'? A substantial body of research suggests that success or failure is often dictated long before physical work commences, and that successful programmes are not an accident but the result of a combination of many pre-conditioning factors.

Certainly on London 2012 there was no 'silver bullet'. The programme's success was the result of a combination of factors involving organisational, structural and operational mechanisms. There was a clear alignment of objectives, application of rigorous programme management and strong leadership at all tiers combined with a positive attitude, behaviour and interaction between all the people involved.

An obvious factor was the 'Olympics effect', which provided a compelling drive to succeed by everyone involved in the programme and helped attract a high quality workforce. The shared aspirations of government, ODA and its supply chain to showcase the UK in

the best possible light allowed ODA the freedom to embrace more challenging objectives. These went beyond the usual construction deliverables of time, cost, quality and health and safety to include more far-reaching priority theme targets such as sustainability, equality and inclusion, and employment and skills. These aspirations acted to align goals, push the boundaries of UK best practice and drive innovation in the industry.

Another factor was ODA's decision to be an 'intelligent client' but to make use of a delivery partner with the right skills and experience to mobilise quickly and focus on delivering the project. In a similar manner each of the major venues and infrastructure works were tendered and managed as separate projects (but linked into one integrated programme), tapping into the contractors' expertise and established supply chains. The appointment of quality contractors with proven experience – overlaid with the strong programme and project management capability provided by the delivery partner and the intelligent client assurance from ODA – provided an aligned, comprehensive and robust delivery framework.

With regard to procurement, ODA chose to use a balanced scorecard approach to supply chain tendering, positioning its priority themes firmly at the top of the agenda alongside cost and programme. By using back-to-back incentivised agreements between ODA and its delivery partner, and including priority theme targets in the contracts, ODA ensured its aspirations were aligned with those of the supply chain. This, together with appropriate use of the NEC3 suite of contracts and incentivisation, promoted a culture of shared success. It was further supported by the transparency of reporting and early identification of issues, encouraging collaborative working and shared problem solving. A rigorous application of project and programme management processes alongside high levels of assurance and audit also provided robust and transparent information on which management could confidently act, making informed decisions efficiently and effectively.

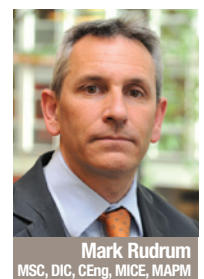
However, the overriding success factor was the outstanding collaborative



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team effort involving ODA, the delivery partner, the contractors, designers, the supply chain and stakeholders. This was underpinned by cross-party political support. Strong leadership has been apparent at all levels across the programme and is a testament to the health, vitality and professionalism of the UK construction industry.

The first London 2012 special issue of *Civil Engineering*, entitled *Delivering London 2012: Planning and People* (ICE, 2011) focused on client-side strategy and policy. This second volume describes the physical delivery of key assets on the Olympic Park. The papers discuss how each of the project teams for the major infrastructure and venues projects individually responded to the briefs set by ODA and the challenges of design and construction.

In the first paper, Hellings *et al.* (2011) describe the wide-ranging geo-technical and geo-environmental aspects of the £392 million enabling works for the Olympic Park. This included site investigation and clearance, bulk earthworks, soil remediation and groundwater treatment – all of which resulted in creating a safe and sound development platform on which to build the park's extensive infrastructure and venues.

A critical part of site clearance was the removal of 52 high-voltage electricity pylons criss-crossing the site and transferring the power lines into two tunnels. Twine *et al.* (2011) report on what was one of the most complex multidisciplinary engineering and tunnelling projects in Europe at the time, and how the £250 million scheme was delivered in under 3.5 years – half the industry norm – and within budget and on time.

Maybank *et al.* (2011) then discuss the £235 million Olympic Park utilities project. In particular they explain the utilities frameworks adopted and how the opportunity to implement a sustainable, low-carbon-dioxide development was implemented through centralised energy centres, utilising innovative 40-year concession contracts, provision of non-potable water networks and innovative designs for foul-water pumping and tunnelled sewers.

Next Baird *et al.* (2011) describe the challenges around delivering £614 million

of highways and bridges on the Olympic Park, achieving a balance between permanent versus temporary for the backbone of the infrastructure network to meet the needs of construction, games and legacy.

The parklands and waterways lie at the heart of the Olympic Park and are vital to stitching together the venues, infrastructure and outlying communities. Hopkins *et al.* (2011) describe the £246 million project, which included addressing flood-risk mitigation through use of wet woodlands, ponds, swales and river edges and provision of hard and soft landscaping for a leisure park suitable for both games and legacy.

Crockford *et al.* (2011a) then report on how the £486 million, 80 000-seat Olympic Stadium – host of the athletics events and opening and closing ceremonies during the games – was designed as part temporary to be reduced to a more financially viable 25 000-seat stadium in legacy. A triangular-section structure raking outwards and highly efficient use of space has resulted in the lightest stadium of its size worldwide, and with a flexibility for all legacy needs.

The £269 million Aquatics Centre is also an iconic venue designed to be part-permanent, part-temporary to meet a 17 500 games capacity and 2500 legacy capacity. Crockford *et al.* (2011b) describe the challenges of constructing the wave-shaped roof, installing foundations above the power-line tunnels running beneath the venue and achieving a high quality concrete finish while maximising sustainable content.

Arnold *et al.* (2011) then explain how the £102 million Velopark, containing the stunning 6000-seat Velodrome, is the most environmentally friendly venue on the park. In particular, the innovative design and construction of the lightweight cable-net roof reduced embodied carbon dioxide content by 45% and cut the programme construction period by 5 months.

Finally Nimmo *et al.* (2011) describe the innovative and complex process of planning and designing the major programme of temporary venues that complement the permanent venues to meet London 2012 games-time requirements. Using the £42 million, 12 000-seat Basketball Arena as a case study, they set

out the unique challenges of designing temporary venues capable of delivering a world-class theatre for the games and at the same time meeting sustainability, quality, technical and cost parameters.

We are grateful to all the authors, referees, assessors and organisations who have made this special issue possible and hope that it becomes an invaluable reference for the civil engineering profession. ODA has also been working with the Institution of Civil Engineers to produce a wide range of more technical papers for publication in the specialist journals of *ICE Proceedings* – all of which (including these special issue papers) are free on-line from the ICE virtual library at www.icevirtualibrary.com. A third special issue of *Civil Engineering* examining the legacy of the games will be published in the near future.

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