T5 case study

Seminar 136 held at the Cavendish Conference Centre, London
23rd October 2007

Summary

Introduction

Following on from the longest public inquiry in UK planning history, in the late summer of 2002 BAA started the five year assembly phase of the £4.3 billion Terminal 5 (T5) programme at Heathrow Airport. In September 2007 the works were formally handed over to the operator, Heathrow Airport, for a six month operational readiness period prior to opening on 27 March 2008.

The seminar focused on how this complex programme of works – located on a site the size of Hyde Park between the world's most heavily utilised runways – has been delivered whilst remaining on course to achieve its stated objectives of cost, time, quality and safety.

Key figures from BAA and first tier suppliers involved in running the project provided an insight into their experiences, observations and lessons learned.

Particular focus was given to the T5's team's unique approach to project management, enabled through the bespoke T5 Agreement.

Setting the scene

The T5 programme is effectively a series of major projects in their own right, involving many disciplines and a variety of stakeholders.

The first presentation provided an overview of the history and background to the T5 project, and what it comprises in terms of size and complexity. For instance there is more to the project than simply the creation of the assets: planning requirements imposed a number of obligations, such as landscaping, environmental and archaeological considerations and the building of several logistical centres, including a railhead and an off-site factory for the fabrication of reinforcement steel structures.

T5 has two delivery phases. Phase 1 consists of the main concourse building (T5A), at which people will arrive and check in and the first satellite building concourse (T5B), together with the air traffic control tower and other infrastructure and buildings supporting the facility; phase 1 provides a capacity for about 27 million passengers per annum.

Phase 2 comprises the second satellite building concourse (T5C) and when completed will add a further three million annual passenger capacity.

…continued

scene continued

The photographs below show the T5A and T5B buildings:

T5A

T5B

The T5 road and rail interfaces and transport arrangements were outlined. Roads converge into a single facility known as the multi-storey car park (MSCP5), which provides access and parking for buses, coaches, taxis and cars immediately in front of T5A. For rail users, the Piccadilly line extension (PiccEx) and the Heathrow Express extension (HexEx) run into a new station beneath T5A. The T5A building and its satellites T5B and T5C are connected by a sub-surface passenger track transit system, which conveys arriving and departing air passengers in an automated people mover.

Some of the numerous work in progress challenges during the five year construction phase were explained. For instance, the requirement to divert the course of two rivers running directly across Heathrow to the airport perimeter meant that the site was effectively bisected in two until the new channels had been constructed. Relocating the rivers also required the capture and relocation of both the habitat and various species living within it, such as the water vole.

The T5 Agreement

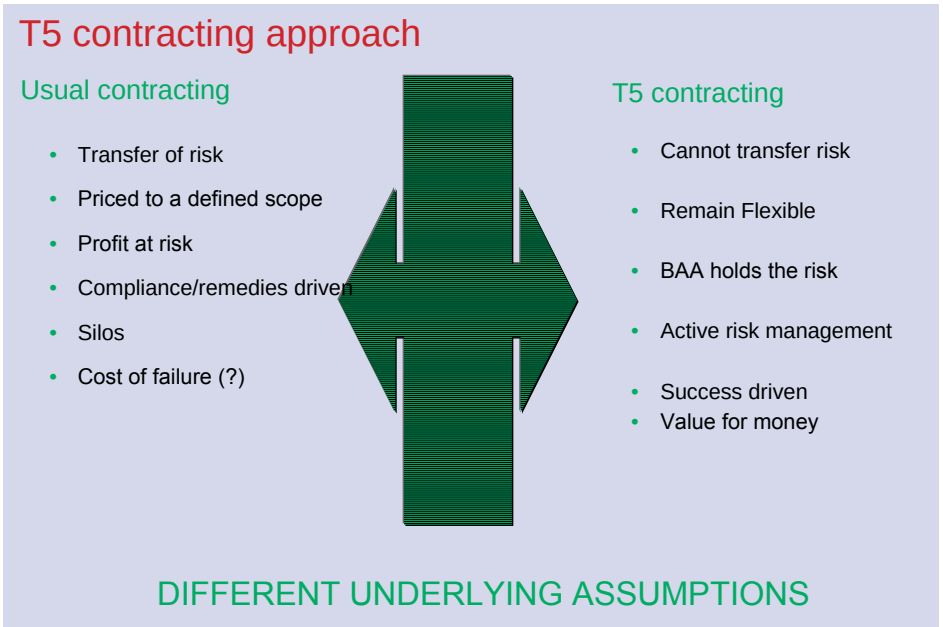
The second presentation described the origins of the development and introduction of the T5 Agreement, a form of contract which represents a significant departure from commonly held concepts about contracting.

Various factors shaped BAA's thinking. For instance, events such as the Heathrow tunnel collapse in 1994 pointed to the need for holistic thinking about risk, supported by integrated teams that would solve problems in a multidisciplinary way. During the 1990s numerous major projects were running late, and the construction industry was being challenged by reviews and reports identifying cultural issues that had to be overcome before construction performance would improve, for example the adversarial relationships that existed between construction firms, consultants and clients.

Emergent thinking led to the New Engineering Contract (NEC), first published in 1993. BAA became one of the first companies to use it, bringing project management into contract thinking and developing a more 'relational' culture, where the client was starting to work with the contractors to solve problems as and when they arose.

The size and scope of the T5 project, where 16 projects were being managed in a single programme, presented a number of challenges that posed potential risks to BAA. The principal aim of the T5 Agreement was as an enabler and a bridge to ensure that the risk to the company could be managed and that it was in the contractor's interests to be involved in managing the risk.

This required changes in thinking and approach, as outlined in the following illustration:



How T5 was delivered

The third presentation looked at the procedures and processes required to support the T5 Agreement in practice. This involved a change in people's behaviours and thinking, and the creation of an integrated team environment.

BAA took all the risk, all the time: they paid defined costs around the build element, put a ring fence around the contractor's profit and overheads, and thereby eliminated the need for the contractor to price the risk. In return for BAA taking all the risk, the contractors had to think and work differently and embrace the concept of a single integrated team.

Although part of the integrated team, BAA ensured that the right person led the teams – in some teams this would be BAA, in others a contractor or consultant. Aligned against this structure were the target costs, a shared incentivising mechanism and a set of insurance products that underpinned that whole process.

Some of the ways in which BAA engendered goodwill and encouraged personal responsibility amongst an organisation of 8,000 people were considered. For example the health and welfare of the staff was a priority, there were reward schemes for individuals and teams who went beyond the call of duty, and staff at all levels were asked to be accountable for four targets – making T5 safe, delivering quality and keeping within budget and schedule.

The supplier's view

Two senior representatives from two of the leading first tier suppliers provided their perspective on the application of the T5 Agreement.

Both suppliers endorsed the view that the T5 Agreement created a very positive environment in which to operate. As integral members of the design and construction team their voices were just as important as anyone else's, and their employees regarded themselves as part of a T5 team rather than seconded employees of particular companies. Everyone was committed to the delivery of the project, and operations were carried out safely, together – something that does not always happens within the construction industry. It was felt that the T5 Agreement principles should be replicated in other projects.

Two projects were described which demonstrate the value of the Agreement. In the first, as a key member of the delivery team the supplier had the opportunity to raise some concerns about a design which had some inherent programme and cost risks. BAA then facilitated a debate with all the relevant parties, which resulted in changes which satisfied all sides. The second project involved problems in the fabrication and production stage of another part of the programme. BAA's approach to risk, with the emphasis on a solution rather than allocating blame, enabled the team to direct their energies into resolving the issues in a pragmatic, not adversarial, way.

The client's perspective

The final presentation considered the client's perspective of the challenges of the T5 project, and the key lessons learned.

It looked at the main themes of BAA's approach to the creation of an environment for success, for example:

1. The contract – T5 Agreement

The 'softer' people issues presented the greatest challenge. Suppliers and subcontractors were chosen not just for their technical skills but for behavioural competence and an understanding that the Agreement had a fundamentally different set of assumptions to traditional contracting.

2. Risk management

A great deal of research was undertaken before deciding on the stance to be taken regarding risk management. BAA chose to hold all the risk all the time because it enabled transparent working arrangements with the supply chain. BAA played an active role in shaping and influencing the outcomes.

3. Influencing behaviours

Engendering the right mindset in all of the team members presented one of the most significant challenges of the project. At the outset few people embraced the T5 approach, and a great deal of time was required with senior personnel to explain the behaviours expected.

At the highest levels people wanted the same result as BAA: a quality job, an enhanced reputation and a predictable cost outcome. The main challenge was embedding the T5 culture and ways of working across the programme, and BAA spent time with the human resources directors of the top 50 suppliers to ensure that this happened.

4. Communications

Influencing behaviour is closely connected with communications. The iconic nature of T5 meant that BAA could remind individual employees to feel proud that they were members of the team that was creating and delivering a large infrastructure project safely, on time, on budget and to a defined quality.

5. Performance management

BAA explained some of the many challenges faced in setting up and managing performance at an effective level and depth both within BAA itself and throughout the project teams. For example, T5 was packaged into a large number of separate projects and subprojects, but performance was measured at subproject level. When applying commercial judgement to performance issues these had to be seen in the context of the overall project. The challenge for the client and for the integrated team was to see where there were trade-offs and interdependencies between the various subprojects, a skill that took time to perfect.

…continued

BAA is formulating a third generation of agreement frameworks, in which the principles of the T5 Agreement will be maintained:

- long-term relationship frameworks
- project awards based on performance
- progressive dependence on and development of trust in supplier capability
- pre-agreed commercial models with incentives and targets
- collaborative working with real-time transparency
- active management of risk and opportunity
- an alliance driven by common objectives, behaviours and values

Conclusion

The Chairman summed up the proceedings by noting that risk management is not simply part of project management, but that project management exists to support risk management. Meeting the challenge of project management in a complex programme such as T5 depends on the flexibility to change and improve the plan when circumstances change.

‘Uncertainty’ is a synonym for ‘risk’ and the T5 team clearly got on top of the uncertainties and produced the forecast outcome with creativity, confidence and initiative.

Participating organisations

Arup
BAA plc
BAE SYSTEMS, Air
BAE SYSTEMS, Submarines
Balfour Beatty plc
BBC Projects
Bircham Dyson Bell
British Airways plc
British Energy
Centre for Research in the Management of Projects (UCL/UoM)
CJ Associates
CMS Cameron McKenna LLP
Comply Serve Ltd
Cross London Rail Links Ltd
Costain Ltd
Denton Wilde Sapte
Department for Transport
Emcor Rail Ltd
Ernst & Young LLP
Freshfields Bruckhaus Deringer
KPMG LLP
Laing O'Rourke
London 2012 Programme
Metronet Rail
Ministry of Defence (DPA)
Murray & Roberts Holdings
Mott MacDonald Group Ltd
National Air Traffic Services Ltd
National Audit Office
Network Rail Infrastructure Ltd
Nuclear Decommissioning Authority
PA Consulting Group
PricewaterhouseCoopers
QinetiQ
Risk Solutions
Rolls-Royce plc
Said Business School
Sama Contracting
Scott Wilson Kirkpatrick & Co, Ltd
Severfield-Rowen plc
Shadbolt & Co LLP
The Nichols Group
Transport for London
Westfield Shoppingtowns