“Design for Six Sigma (DFSS)”
Improving Airport Project Delivery
Gatwick Airport – A Case Study

Speaker: Steve Riano, Manager of Bechtel Aviation Services
This presentation demonstrates the use of “Design for Six Sigma (DFSS)” as an innovative process to improve airport project delivery systems and its recent application at Gatwick Airport.

The presentation also addresses the challenges of changing the delivery process at a time when the airport is currently developing one of its most significant capital projects.

Future presentations will demonstrate other innovative practices, approaches and tools applied at Gatwick to improve airport project delivery.
Background

A Global Infrastructure Partners (GIP) led consortium supported by Bechtel acquired Gatwick Airport Limited (GAL) from British Airports Authority (BAA) for approximately US$2.3 Billion on 4 December 2009.

With the acquisition, GIP inherited a 5-year US$1.5 billion Capital Improvement Program (CIP).

Gatwick is a now fully privatized airport but still operates under a heavily regulated regime.
GIP is an independent fund comprising former senior executives of General Electric (GE) and Credit Suisse that invests in infrastructure assets worldwide.

GIP works to improve infrastructure for the community by drawing on its global capability and applying industrial best practice to enhance operating efficiency.

GIP also owns London City Airport which it acquired in 2006.
Bechtel Facts

- Bechtel is one of the world’s leading engineering, procurement, construction (EPC) and program management companies.
- Bechtel has provided EPC services for airport development for more than 70 years and has worked on multiple projects at over 40 major airports in the last 10 years alone.
- Bechtel has owned and operated privatized airports throughout the world including London Luton, San Jose Costa Rica, Lima Peru, and Curacao Netherlands Antilles.
Gatwick is the UK’s second busiest airport currently handling approximately 34.5 mppa through two terminals.

Gatwick is the world’s busiest single runway airport.

Gatwick primarily serves the leisure travel market and has around 80 airlines (short- and long-haul scheduled, low cost and charter) serving more than 200 destinations.
Gatwick is famous for its airside pedestrian bridge which opened in May 2005 linking North Terminal to Pier 6 and is capable of allowing a 747 to pass underneath.
GIP’s Vision and Mission

- Transform the existing organization into an efficient airport owner
- Bring in new senior management to lead the transition
- Second Bechtel staff into the existing Gatwick Development organization and transition team in key management roles
The Transition Team’s Brief

- Evaluate all aspects of the existing Capital Development program including people, projects, processes and tools

- Recommend improvements and develop a transition plan to ensure alignment with the GIP Business Plan and with the intent to “deliver more for less”
The Team’s Accomplishments

- Individual projects were re-designed to save cost and to deliver value without sacrificing project requirements or service levels.
- Cost savings enabled new projects to be introduced to improve airport operations, increase levels of service and improve the airport’s earning potential.
- New project delivery processes and procedures were established to increase efficiency and remove project approval levels using the ‘Design for Six Sigma’ system.
Why Six Sigma?

- GE Process Improvement system introduced by Jack Welch (Former CEO) in 1996 and embraced by GIP
- Bechtel chosen Process Improvement system applied to more than 2,500 projects in over 45 countries
- Together GIP, Bechtel and GAL have applied Design for Six Sigma (DFSS) principals to the Gatwick Airport Project Delivery Process
Benefits of DFSS

- Establishes streamlined procedures
- Defines projects in a more coherent manner throughout each phase of delivery
- Ensures proper checks & balances (i.e. proper governance of projects by senior management)
- Creates uniformity across the various projects/teams
**Tollgate 1 – Approving the Start Up of the Project**

- Customers Agreed
- Customer Needs Defined
- Current Process Capability assessed
- Alignment to Gatwick Vision and Strategy assessed
- Stakeholders agreed, attendance at Tollgate reviews agreed
- Initial Business Risks assessed
- High level Financial Assessment completed
**Tollgate 2 – Approval of Brief, procurement plan & release of funds to Tollgate 3**

- Translate Customer Needs into ‘Critical To Quality’ success criteria
- Complete HSS&E Screening Assessments
- Set Project targets, (cost, schedule, quality, sustainability, smart milestones etc.)
- Develop first stage procurement plan
- Carry out passenger journey and project risk assessments
- Update Business Case
- Consult with Stakeholders
Design for Six Sigma - Tollgates

Tollgate 3 – Option Approval, Capital Update, Procurement Plan Update & release of funds to Tollgate 4

- Complete HSS&E Scoping Assessments
- Procure and appoint Prime Design Consultant
- Develop and evaluation Options against the Critical to Quality Factors
- Develop Project Execution, Business Integration & Design plans
- Update procurement plan to reflect preferred option
- Revisit Business Unit, Passenger Journey and Project risk assessments
- Update Project targets, (cost, schedule, quality, sustainability, etc.)
- Carry out Stakeholder consultation on preferred option
Tollgate 4 – Production/Implementation Start Up, Capital Update, Release of full funds, Authority to Appoint Prime Contractor

- Complete enough design to produce Employers Requirements/tender information
- Complete trialling, testing and simulation of solution
- Update Procurement plan and procure Prime Contractor
- Check compliance with Design Stds, obtain design certificate
- Update Project Execution, Business Integration & Construction, Fire and Environmental plans
- Revisit process & project risk assessments
- Complete Stakeholder consultation on current design
Tollgate 5 – Ready to 'Go Live' following completion of construction and business integration

- Complete Production Design, obtain sign off
- Complete ‘Start on Site’ preparation
- Complete Production/Construction/Implementation
- Prepare for ‘Go Live’
- Completion of business integration
- Permits, licences and consents to operate are in place
- Review impact of residual risks to the Business
- Asset Stewardship and maintenance Integration activities completed
Design for Six Sigma - Tollgates

Tollgate 6 – Project Complete, Financial Close out, Zero Punchlist Items

- Review of residual risks and incorporate in Risk register
- Complete Performance Review 3 months from Beneficial Use
- Close out Business Integration
- Carry out post project learning review
- Organise Investment Performance Review
Step 1 - Commercial Engagement Assurance

- Review and approval of Procurement Strategy
- Life Time Cost reviews
- Contract Commitment tracking
- Supplier Selection
Assurance Reviews

- Step 2 - Operational & Technical Assurance
  - Review(s) involving project and business Stakeholders to ensure that the proposals being put forward align with the overall Gatwick Strategy.
Assurance Reviews

- Step 3 - Performance Assurance
  - Analysis of the monthly Programme Performance Report analysing the live programmes and projects performance against the published CIP
Assurance Reviews

♦ Step 4 - Solutions Assurance
  • Review how the project has been managed against set requirements and process steps

Operational & Technical

Commercial

A

Performance

Solutions
Rigorous and detailed Assurance Sign-Off sheets were prepared for each tollgate.

Each tollgate Sign-Off sheet must be completed prior to advancing to the next tollgate.
### Tollgate 1: Customer and Business Needs
Tollgate Approval; Approving the Start up of the Project

**DATE:**

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<thead>
<tr>
<th>CHECKPOINTS</th>
<th>TASK DESCRIPTION</th>
<th>RAG</th>
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<tbody>
<tr>
<td>1.0 Customer needs defined</td>
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<tr>
<td>1.1 Customer Names</td>
<td>List all customers who are interested in the project</td>
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<tr>
<td>1.2 Customer Needs</td>
<td>Produce a customer needs map. List customers on post it notes, then organise and group.</td>
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<tr>
<td>1.3 Voice of the Customer (VOC)</td>
<td>Complete phase 1 of the Voice of the Customer, listing and grouping customer/business requirements. Use existing databases for information from passengers, airlines, partners etc. Include HSSE targets and objectives</td>
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<td>2.0 Current Process Capability</td>
<td></td>
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<tr>
<td>2.1 Current Process Capability/Issue</td>
<td>Review how the current process performs against the customer needs/requirements</td>
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<tr>
<td>2.2 Future Forecasts, volumes, behaviours</td>
<td>What are the future forecasts for passenger volumes, airline mixes etc. which would impact the customer needs? What are the changes in behaviour which are likely to happen?</td>
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<td>2.3 Alignment with 5-10 year vision</td>
<td>Is this project consistent with Gatwick’s 5 to 10 year vision, strategies &amp; targets?</td>
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Pier 6 Extension - Facts

- US$200 million budget for new pier development
- Provides 5 new Code E and 2 new Code F or 12 new Code C pier served stands (SuperMARSed)
- Increases pier service level and minimizes walking distances
Pier 6 Extension - Phasing

- Existing Pier 6 provides 2 Code E and 9 Code C pier served stands
- Existing Code C stands can only serve smallest aircraft in category such as 737-400 and A319
Pier 6 Extension - Phasing

- Provides 3 new Code E and 1 new Code F or 7 new Code C pier served stands
- All new Code C stands can serve largest aircraft in category including 737-800 and A321
Pier 6 Extension - Phasing

» Provides 2 new additional Code E and 1 new additional Code F or 5 new additional Code C pier served stands

» Provides 6 new Code C remote served stands
Pier 6 Extension - Modeling

SIMMOD Airfield Simulation
“By linking the process driven cultures of both GE and Bechtel, the development of a Design For Six Sigma (DFSS) application for Gatwick Airport’s Capital Improvement Program (CIP) was a natural outgrowth. Gatwick Airport has already seen the benefits of implementing the DFSS program, including improved performance, streamlined procedures that increase staff productivity, and a higher level of governance all of which provides greater confidence to senior management.”

Ray Melee, *Gatwick Airport Projects Director*