



Client: Carillion plc
Assignment: Integration of Lean Sigma for continuous process improvement in £175m scheme to upgrade A74 between Carlisle and Guards Mill

M6 extension puts Lean Sigma on the map

The A74 between Carlisle and Guards Mill is the “missing link” in the motorway network between London and Glasgow. Stretching 9km, the road carries 42,000 vehicles a day. The scheme to upgrade the dual carriageway to motorway also included two new major structures crossing the River Esk and West Coast Main Line, demolition of the Mossband Viaduct and provision of a new all-purpose road.

Having developed an impressive track record with the Highways Agency, Bourton Group was asked to help Carillion deploy Lean Sigma improvement methodology to bring the project in on time and significantly under budget.

Our approach

The programme focused on efficiency improvements in Approval, Design and Construction processes. As with all large and complex improvement programmes, we needed an approach that would:

- Introduce and deploy a structured approach to process improvement
- Enable analysis and measurement of performance
- Deliver tangible benefits that impacted upon programme delivery
- Enabled the organisation to be self sufficient in addressing future opportunities

The approach we recommended was essentially a pragmatic one, combining the need to equip people with the capability to undertake improvement projects in the short term, with the desire to have expert support working alongside them to guide, mentor and deliver benefits over the longer term. We introduced a team of Lean Sigma master black belts to lead the programme and provide consistency in transferring Lean Sigma skills to Carillion’s own personnel.

Getting started

An early step was to identify and train champions drawn from the core construction team to provide internal leadership for the programme. We ensured a steering group was established to oversee the necessary checks and balances that such a major change of approach entailed, and to ensure ongoing alignment with operational goals. With them we agreed and monitored timing plans, resources, measures and benefits.

Managing for success

Next we identify the most appropriate projects to kick start the approach. These needed to be high profile, achievable and capable of reaping significant benefit in order to gain early credibility. Once these were underway, we set up and lead monthly project reviews and quarterly programme reviews both to ensure that projects were on track and that the rolled up benefits were contributing to contract performance improvement. A key role was the ongoing training and mentoring of Black and Green belts as they identified and delivered their own improvement projects.

From the start, we developed sound working relationships with Carillion's customer, the Highways Agency, and the suppliers of contracted services to ensure that all parties were aware of changes to processes and able to adapt to the new ways of working.

Process improvements

We worked with Carillion to develop and co-ordinate a programme of discrete process improvement projects. These attacked known problem areas within specific schemes and were tackled by a powerful combination of our Lean Sigma Master Black Belts and Carillion's growing cadre of Black and Green Belts. Using the proven DMAICT methodology and integrating Lean and Six Sigma tools, we helped people to identify the root causes of performance problems and implement a raft of new processes to eliminate waste and variation.

Building capability

Bourton trained Champions, Black Belts and Green Belts, then provided full time Master Black Belt support to help identify improvement opportunities and mentor the internal resources. This ensured that optimum benefit was gained from the methodology and that people had the confidence to take projects forward on their own in the future.

The team are now fully self-sufficient and senior managers are looking to replicate the same improvements in other parts of the Carillion organisation.

Value delivered

- £20.5m of savings for tax payers to date, £4.7m of savings directly attributed to Lean Sigma
- Project completed on time
- Established a Continuous Improvement Culture
- Resulted in a better focus on the customer
- Reduced the time and effort of 'fighting fires'
- Improved communication links between teams
- Strengthened the organisation for future tendering

“Despite initial scepticism, I am convinced Lean Sigma can deliver massive benefits within construction and infrastructure. We have demonstrated that a data based approach that engages people in the improvement can change the way work is done – for the good of us and our customers”.

Steve Kennedy – Operations Director, Carillion plc.

“The whole ethos is different because we’ve created an environment where everyone is challenging their own assumptions. A massive amount of what we’ve done is improving communication links between the designers, project engineers and quantity surveyors to build a more integrated unit. Collaboration with Bourton has given us greater awareness of potential barriers and issues. Their consultancy was extremely pragmatic, like a ‘route map’ that helped us to get from A to B”.

Shane Betts - Process Improvement Manager, Carillion plc

Typical performance improvements

Post Public Enquiry process

Accelerating the statutory process following a Public Enquiry reduced the consequential delays by 6 weeks, representing £949,000 of savings. A 6-week reduction for each project over the next 10 years could save as much as £80m (based on £15b investment).

Structures Design Process

New work methods and procedures for communicating design changes along with the introduction of more rigorous controls to the Design process resulted in a 40% reduction in Technical Queries and the consequential need for design rework. The benefits are estimated at £500,000 in reduced design costs.

Earthworks

Increasing the use of equipment and optimising the labour resource resulted in increased productivity in Earthworks cut and fill processes and generated savings of £1.56m.

Piling Operations

Increasing the number of Concrete Bridge Piles constructed each week from 6 to 10 recovered the Piling operation from “critical path” status and prevented the overall programme overrunning by 4 weeks, saving £651,000. A similar project was completed for the smaller “Segmented Flight Augered” piles which increased productivity by 40%, saving a further £970k.