

SCL Radial Joint Design Bank Station Capacity Upgrade

Bethan Haig



SAFET\



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Stakeholders

Dr Sauer & Partners – SCL Designer

Dr. SAUER & PARTNERS Dragados – Design & Build Contractor

DRAGADOS

London Underground – The Client





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The Project

Triple escalators provide direct link from Central line to Northern line level

> Former southbound Northern line platform tunnel re-used to increase circulation and interchange space for customers

New entrance to Bank station on Cannon Street. Lifts and triple escalators from street to Northern line and DLR

> New southbound railway tunnel and platform for Northern line to create more space for customer circulation

Moving walkway in new tunnel provides greater capacity whilst reducing walking distances and interchange times



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The Team Approach

Biweekly constructability review meetings

SCL DETAILED DESIGN



 Collaborative approach to improve health and safety and efficiency through design

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SCL Safety Hazards and Quality Issues





- Fallouts
- Complex connections of reinforcement at radial joints
- Poor quality jointing
- Poorly executed design



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The Design Solution

Change behaviour in the tunnel



No entrance to sealed tunnel face

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The Design Solution



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Dr. SAUER & PARTNERS

Safely Together





Trialling the Design and Workmanship



The joint was tested as part of the pre-construction trials



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Trialling the Design and Workmanship The joint was tested as part of the pre-construction trials

Option A joint core



Figure 15: Option A Core from Panel 5 at 8%Acc. Vs Normal Core from Panel 2 at 6% Acc.



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Normal core





The Design in Use

- The project has seen excellent implementation of the joint in the construction stage.
- Excellent workmanship
- Tight Supervision

Step 1: Primary SCL at stepped joint





Step 3: Primary lining to full thickness





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The Design in Use The SCL construction process is now completely mechanised



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The Feedback

The implementation of this joint design has gleaned the following feedback from the construction team and miners:

This is one of the most positive changes to the industry in the last 20 years Once mastered it could be said that this is a step change for tunnel health and safety

We are particularly impressed with the elimination of HAVs, removal of honeycombing around bars and the associated defect repair The joint is one safety change that we can see really and truly making a difference to the team on site – Nice one!

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