

Case Study : Birmingham New Street



In Mid 2011 ASG were contracted to manufacture and install a new service spine to the new £600 million Birmingham Gateway Plus project at Birmingham New Street Station. Measuring 130 meters long, 7.5 meters wide and weighing over 300 tonnes it would become Europe's largest ever service spine.

Due to the complexity of the project NG Bailey's Offsite Division needed to engage with a subcontractor, who had the capacity and the capability to undertake the manufacture of the large prefabricated spine modules. ASG were selected as the preferred sub-contractor from their approved supplier base.

Working closely with Bailey's Off-site manufacturing division and their design engineers, ASG's experienced fabrication team were able to offer practical solutions to some of the design challenges which could then be incorporated into the super structure using up to date 3D CAD modelling systems enabling us to produce concise fabrication drawings.

The spine modules were manufactured on a production line to increase safety and efficiency throughout the workshop.



Firstly the lattice trusses that would form the side of the spine modules and give them their strength were produced as a flat frame, these were fully welded and quality checked before adding the unistrut containment arms that would carry the services. Next the frames were assembled into 3D spine modules on a purpose built jig to ensure each module was manufactured to exact tolerances. Quality checks at each stage of the process ensured no defects and no reworks.

Following the fabrication the frames were transferred to our specialised painting department to receive its multi-coat, high specification intumescent fire proof coating. To ensure the correct specification of a 1 hour fire rating was achieved, over 1000 individual readings were taken per module, using the latest thickness gauge technology available.





The modules were then transported to Bailey Offsite to be populated with the Mechanical and Electrical components ready for the site installation.

The installation phase presented the most challenging aspects of the project,

as the spine was to be installed over a live railway station with a 1960's concrete deck that could not cope with the sheer weight of each module. The spine was to be suspended from the 24 existing concrete columns, drilling 144 holes, 38 diameter through up to 600mm of concrete producing over 80 liner metres of concrete cores, without damaging any of the steel reinforcing. These holes would then be used to fix the vierendeel support brackets that were to support the service spine in its entirety.



A purpose built track was then constructed to run the full length of the station to spread the load of each module equally across the concourse, reducing direct load to the concrete deck.



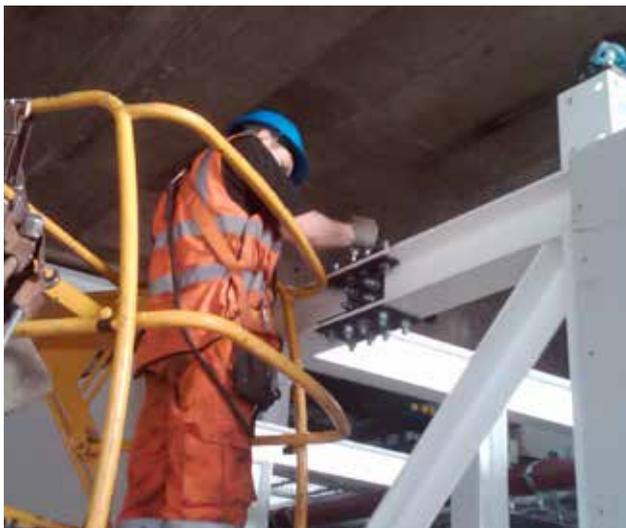
The next stage of this epic build was to fit the "vierendeel" girders, also constructed at ASG, into the roof which the spine would eventually be fixed to, but with the floor proving to be too weak to lift from, all structures would have to be hoisted from the concrete slab above.

With this in mind we constructed factory tested lifting brackets which were anchored and tested, to the concrete slab above, allowing the "vierendeels" to be chain blocked into position and fixed accordingly.



Working nights to avoid disruption to the station and other trades, a team of up to 8 operatives would then take delivery of the spine modules, 2 at a time, craning them onto the purpose built track and bolting the 2 spine modules together to create 1 section before beginning the task of pulling the section the full length of the station with a specially designed “tirfor” pulling tool.

4 x 20 tonne chain blocks would then be attached to the inbuilt lifting points within the vierendeel girders at each corner of the module and attached to the tested lifting brackets bolted to each of the corners on the module before lifting could commence.



4 men then began the slow and steady task of pulling the chain blocks which lifted the spine sections into their final position and bolt to the girders thus creating the “mechanical and electrical” service spine.

With all 24 modules fully installed, the temporary track was removed and cleared from site leaving the 130 metre, 300 tonne spine suspended within the ceiling, ready for all the other trades to come in and transform the former multi-story car park into a 21st century retail and passenger concourse it would finally become.

**Delivered:
a 21st century retail and
passenger concourse**

