Integrated Performance Framework
Strategic KPIs

MAR 2020

CASE STUDY: Reinforcement Cage Prefabrication Jig

Category: Quality

Name: Oliver Goodwin / Martyn Budd

Role: Site Engineer / Section Manager

Tel: 07711 776 163 / 07702 142 903

E-mail: ogoodwin@ferrovial.com / mbudd@ferrovial.com

Company: Ferrovial Agroman UK Ltd

Context:

An assessment of the reinforcement detailing for the roof slab led the FAUK towards a prefabrication solution. Against in-situ fabrication, FAUK targeted more efficient production rates through the implementation of a factory like 'workstation' process. In support of this, FAUK engaged a specialist designer to detail repetitive cages with limited variation. Once the final cage details were reviewed it was confirmed that a pre-defined

Description:

During the current installation of the reinforced concrete roof slab that shall complete the KILO Box, over 1200 reinforcement cages are in the process of being prefabricated away from the main works area.

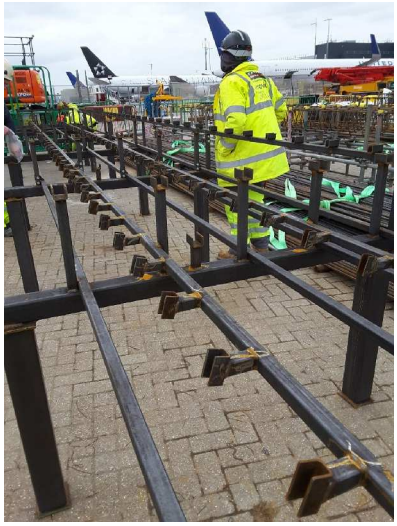
This process allows for mass, efficient, fabrication of similar dimension cages. These works are very repetitive in nature for the workforce. To begin refining the workstation jigs, FAUK trialled an 'A-Frame' type scaffold support. This jig supported the top reinforcement bars of the cages which allowed for easy installation of the links by hanging. Although this was a simple design it was still too susceptible to human error and presented too many logistical issues. Installation of the bottom reinforcement had to be done by threading the 12m bar from one end through the whole cage; therefore needing a 24m linear space per workstation. In addition the lifting protocol, which needed the support scaffold tube to be slid out, called for more clear space surrounding the jig.

These observations led to an improved 'Finger jig' scaffold support where the cage was supported at multiple points based throughout the length of the cage; rather than spanning the width of the cage. This arrangement let the operatives work closer to the cages, provided better stability and, as the bottom rebar could now be dropped in from the top, reduced the working space required. The lifting protocol was bettered by the absence of scaffold within the completed cage. The jig still remained susceptible to human error in that the spacing of links was manual.

FAUK removed this remaining vulnerability to the factory process by commissioning a custom fabricated jig. This jig was designed to provide point supports throughout the length of the most common cages within the design. These slots were at the exact

A-Frame jig

Finger jig



Fabricated jig

B e n e f i t s :

BEST PRACTICE

Reduces susceptibility to human error that leads to consistent high quality production.

Increases productivity of labour through a factory style process.

An ergonomic workstation for the operatives that prevents the need for bending over and hence a reduction in the likelihood of musculoskeletal injuries.

Supports the prefabrication methodology by maximising the fabrication completed prior to installation. Limits the in-situ fabrication to a much smaller group of operatives that lessens the hazards associated with working at height on the corrugated decking.

Promotes a more effective fabrication through a high-degree of repetition within a minimised working space.