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Improving pedestrian access: case study of Hayle Railway Station

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Abstract

Ensuring safe access for passengers at train stations is extremely important, and with over 11 million people in Great Britain classed as disabled, those responsible for stations and the rail network need to ensure that safety measures are put in place for all members of the community. Without suitable handrails, ramps and lifts, access can be extremely limited at train stations. Recent years have seen the launch of several initiatives aimed at improving access for disabled people and substantial amounts of money has been allocated to improve access at main line stations. Safety is, of course, the foremost concern and a correctly installed handrail provides optimum safety for all passengers. There are a number of possible handrailing solutions on the market which satisfy the requirements of regulations and standards such as the Equality Act 2010, Building Regulations Part M and British Standard BS 8300. The two main options available are fabricated systems and tubular structures, which are assembled using standard tube and fittings. The flexibility and benefits of using tube and fittings meant they were able to cater for the specific requirements at Hayle Railway Station as can be seen in the following case study.

Introduction

The recent redevelopment of Hayle Railway Station was a joint scheme between First Great Western, Cornwall Council, Sustrans and Network Rail [1–3].

The aim of the £800,000 scheme was to provide a safer alternative north–south link for passengers and the community travelling through the station. There had been five near misses in a 4-year period, and one fatality in 2009 at the level crossing.

The project involved replacing the existing footpath crossing and turning the disused Harbour Branch railway line into a 350 m combined footpath and cycleway running along the entire length of the disused railway line. New access was created to the south west of the station car park linking the rear of Platform 2 to the underpass via a ramp. The replacement of the crossing with the new access has significantly helped to improve the safety in the area and the lives of passengers and the community (see Figs. 1 and 2).

New bike hoops, improved signage and public lighting throughout completed the scheme.

Hayle Railway Station remained in full use throughout the project with safety ensured for all areas for users of the station. This included full access to the platforms and station facilities at all times.

Kee Systems' involvement

We worked with Raymond Brown Construction to provide 170 l/m of Disability Discrimination Act [4] (DDA) compliant handrails, 60 m of handrails constructed from tube and fittings along with 50 mm × 50 mm Weld Mesh Panels to provide protected pedestrian routes and safeguard new ramps at the entrance to the station and in the walkway to the railway platforms (see Fig. 3).

Raymond Brown chose the combination of our products for the project as they had previous experience of installing these systems in other railway settings. Site Manager Kevin Burrows, of Raymond Brown was impressed with our previous work and how quickly and easily the fittings can be installed on site. The structures are installed with a hex tool and tube cutters, so can be easily assembled without specialised workers or equipment, saving both time and money. This also eliminates the need for any special work permits.

The installation of the rails provided assistance to the elderly and those with limited mobility, as well as forming a fixed barrier that would control pedestrian traffic, reduce risk of trips, falls as well as preventing

Fig. 1 *Replacement of the crossing with the new access*

members of the public, such as children, from straying onto unprotected areas.

Benefits of using fittings

The fittings used guarantee a rigid, stable and sturdy installation and are fitted with both corrosion protected grub screws and recess protection to ensure superior corrosion resistance, as well as defence against signs of wear.

The range of fittings specified includes an 'add-on' offset fitting to permit an additional handrail to improve an existing structure. The modular structure of the system also incorporates impressive flexibility capable of accommodating on site variations.

The range also offers outstanding versatility and is suited to a range of guardrail applications. Manufactured from galvanised cast iron, the system securely joins structural steel tube into almost any

Fig. 2 *Replacement of the crossing with the new access has significantly helped to improve the safety in the area*

Fig. 3 *Handrails constructed from tube and fittings along with 50 × 50 mm Weld Mesh Panels*

conceivable configuration across a variety of angles. Designed with ease and speed of installation in mind, the components completely eliminate the need for hot works on site, resulting in significant cost and time savings, an important factor for the project. Installation is quick and easy as neither specialist labour nor tools are required. The fittings are installed by simply using a standard hex key. Each fitting incorporates an internal set screw which locks the respective fitting safely and securely onto the tube.

50 × 50 mm Weld Mesh Panels can be integrated into a variety of handrail and guardrail structures as was the case at Hayle Railway Station. The Weld Mesh Panels work as an effective screen against litter and can also be used to segregate areas as required.

Correct specification and installation

Fittings are used to construct safety barriers, handrails and guardrails which are designed to separate people from hazards; therefore each installation must be supplied and installed to the specific system parameters. As each project is different in terms of size, angle, structure and hazards, correct specification is crucial. The project at Hayle Station required the handrails to be designed to achieve a 740 N/m design load suitable for pedestrian access in accordance with BS6180-2011 [5]. In order to achieve the design load, correct specification of the uprights tube and horizontal tube was essential. After completing a set of design calculations, we determined the requirements for this particular project to be 48.3 mm O/D upright tubes with a 4.0 mm wall thickness (see Fig. 4).

The installation of handrails along the ramp also required careful planning as the ramp comprised

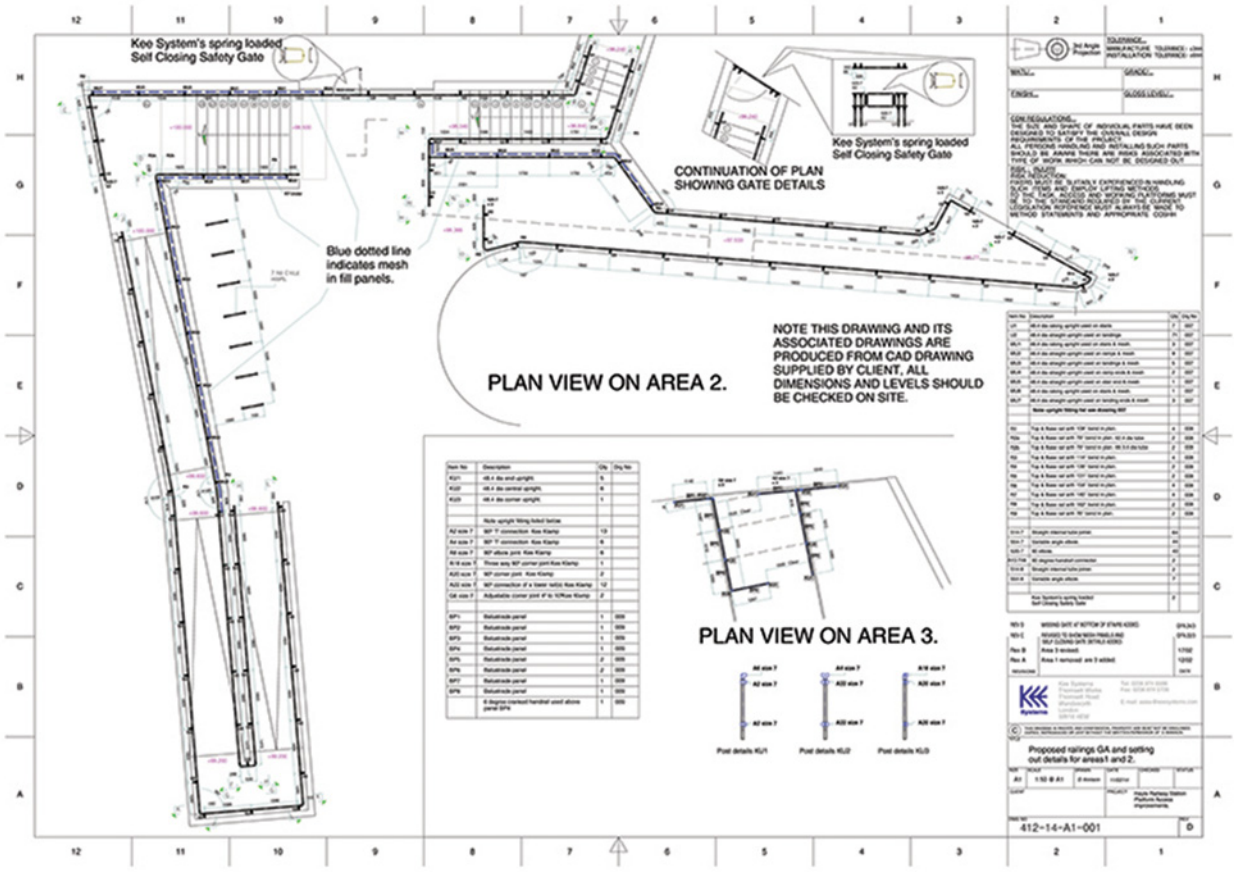

Fig. 4 *Requirements for this particular project is 48.3 mm O/D upright tubes with a 4.0 mm wall thickness*

paving slabs with a brick upstand. Often contractors will undertake the handrail installation themselves without consideration to conforming to the required design loadings, and in similar situations we have seen base flanges anchored on top of brickwork. Within months the brickwork works loose which means the handrailing is non-compliant and potentially a hazard (see Fig. 5).

To overcome this potential problem and ensure correct installation, we used a 78 mm diameter diamond core drill which needed to be 250 mm deep for each upright. The uprights were then resin fixed into position to achieve the required strength and guaranteed durability.

Where tarmac was located, for example along pathways, concrete bases were required to ensure the handrails met the required load design.

Overcoming fall risks

There were certain locations around the site where there was a potential fall risk through the handrails, particularly for young children. In these situations and in order to follow best practice, the systems were adapted to incorporate an additional guardrail or a mesh panel for added security.

The versatility of the fittings enabled long uprights to be included in the handrail systems at these potential fall risk locations (see Fig. 6). Where required, the uprights were extended to achieve the required 1100 mm design height from finished floor level for a guardrail. In these locations, in order to overcome any risk of a fall, a 50 × 50 mm bespoke weld mesh panel was installed for fully complaint safety of the station users.

Project challenges

Lead time from site survey of the weld mesh panels to meeting the customer's project handover requirements proved a challenge as we were working to very tight deadlines. In order to ensure the best aesthetically pleasing system, the mesh panel requirements had to be surveyed once the handrailing structure was in place. From these surveys, each

Fig. 5 *Brickwork works loose which means the handrailing is non-compliant and potentially a hazard*

panel was bespoke manufactured and then hot dip galvanised to ensure value for money and to guarantee that the structure remains fully compliant over many years to come.

Hot dip galvanising prevents corrosion. Each panel was chemically cleaned to remove any oil or residue from the manufacturing process before being dipped into a bath of molten zinc which is heated to around 460°C. The panels were then cooled. Once cooled the zinc coating was metallurgically bonded to the panels. Once galvanised, each panel was then powder coated before installation.

Fig. 6 *Versatility of the fittings enabled long uprights to be included in the handrail systems at these potential fall risk locations*

Thankfully, with well-planned logistics and everyone within the team playing their part this final element of the project was delivered on time and above the client's expectations.

Public safety challenges

Another challenge on the project involved ensuring public safety where a path leads sharply onto the road from the station. This presented a potential hazard in that the public could walk straight out onto the road. The situation was resolved by the installation of a self-closing safety gate (see Fig. 7). The gate is spring loaded to automatically close behind the user, providing an added level of security and overcoming the potential for human error with users leaving the gate open.

As the gate will be opened and closed hundreds of times in any one day, additional coring depth on the uprights was required to maintain rigidity on the uprights either side of the gate.

In this project, the Kee Gate was used. This was extensively tested to ensure guaranteed performance and durability. These included salt spray testing to ASTM B117-11 Neutral solutions over 200 h to assess the coating's corrosion resistance, life cycle testing to BS 6375-2:2009 [6] Clause 6.5 – Opening and closing of Gate through 90° 50,000 cycles and Abuse Testing where 9 × 25 kg weights were suspended from the gate to test its performance against pressure.

Ensuring safe access for all

Ensuring optimum safety for passengers at train stations is extremely important and with over 11 million people in Great Britain classed as disabled, there must be safety measures in place for all members of the community. The Equality Act 2010 requires measures to be in place that do not discriminate against disabled people, and businesses such as the rail provider have a duty to make 'reasonable adjustments'. Installation of handrails is one example of reasonable adjustments that building owners can take.

Safety is paramount but it can be easily achieved with correctly designed and installed handrails. For example, handrails must be between 900 and 1100 mm in height, provide a continuous smooth surface and be installed on both sides of a ramp or stairs. Where there is a drop off, ramps will require a curb or curb rail to prevent wheelchairs from slipping out