

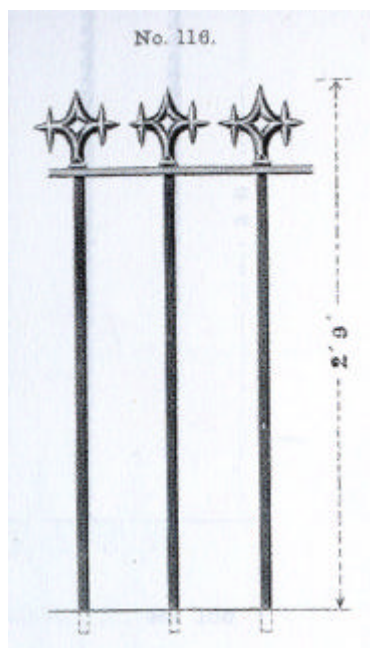
Architectural Cast Iron : Technical Guidance Note 12

Installation of Railings and Panels

Introduction

The re-instatement of architectural ironwork to new cope stones or existing follows basic principles relating to the quality of materials and of installation. Whilst clearly more expensive, high quality cast ironwork will far outlast inferior mild steel or mock Victoriana ironwork mocked – up from cast steel finals welded to mild steel panels. We would therefore architects and specifiers to adopt a long term view and seek to expect high quality work from installers and blacksmiths.

Installation of Railings



This extract from an 1890 catalogue shows a standard railing installation comprising individual railings and a cast iron cope rail. Cope rails were formed to suit the section of the railing. This may have been square, round, quatrefoil, spiral or shaped in some other fashion. Cope rails were also manufactured in wrought iron.

Preparatory Works

New railings should be cast in grey iron, fettled to remove casting marks and blast cleaned to SA 2.5 (see specification for architectural cast iron). Railings should be painted to specification prior to arrival on site, including railing roots. They should be adequately protected to prevent handling damage in transit, and stored carefully on site.

Forming Cores

It is important that the cope stone be clean and the railings marked out with a pre-measured template in chalk. Cores should be cut to allow around 3-4mm around railing. Cores should either be cut by a specialist company, masons with appropriate experience, or installers who have learned the technique off – site. Specialist core drills are readily available and should have a water supply built in to ease cutting and prevent stone damage. Worn or blunt core drills should not be used. It is also possible to cut chases by hand by employing the services of a suitable skilled mason should this be preferred.



Mild steel 'tastefully' installed aside wrought fragments !

A standard height railing run as shown above (2'9") should require railings cored to a depth of one inch for every foot of railing, or in this case approximately three inches.

Railings should not be installed in cold weather or where the stone is laden with moisture. The core should be clean and free from debris (an airline is ideal for this).

Installation

It is useful to manufacture temporary stays to support and align the railings prior to fixing.

The client should discuss the pros and cons of the fixing medium. In general terms these are :

Technique	Pros	Cons
Hot poured lead	Traditional technique. Reversible (to an extent). Aesthetically good. Slow.	Significant H&S risk - requires blood testing. Skilled technique. Hazardous in wet. Variable strength. Bi – metallic corrosion.
Cement grout	Low H&S risk. Relatively low cost. Fast. Full void fill.	Weather dependant. Strength ? Staining to cope. Non reversible.
Epoxy Resin	Strongest method. Can be coloured to match lead. Fast. Full void fill.	Mostly non reversible. Temperature dependant.

The choice of the fixing medium should be considered in relation to the above factors. Whilst purists might only consider lead installations, the Health & Safety regulations for working with hot lead are significant and onerous. A balanced decision should be made in relation to cost also.

In any case, should hot lead be used the temperature of the air and stone should be closely considered in order to prevent a premature chilling of the molten lead and inadequate filling of the void. Lead should be tamped in by hand with a profile to shed water onto the cope itself. Similar considerations should be given to epoxy resin and grouts. The stone should be protected during pouring of any medium, and spillages quickly removed.



Railings installed to granite copes with lead

Cast iron should only be cut or dressed on site as a very last resort, and if so, well away from the work area and downwind. Any exposed metal painted back to specification prior to installation.

THE STAIN DAMAGE TO COPES FROM CAST IRON DUST, PARTICULARLY SANDSTONE, CAN BE DISASTROUS. All work areas should vacuumed or swept daily.

Railings to cope rails should be a snug fit and secured with lead or a small amount of epoxy. Tack welds are a poor and lazy method of securing railings to copes and should be avoided.



Railings installed in the 1920's to replace originals. Note pitch has been altered

Cope rails running into newel posts or walls should be well secured and pre-planned. Bodged jobs are often the result of poor planning and will cause future maintenance problems.

Finally, the image below shows an interesting example. The original spears would have cost around £14 per item to cast new. The railings to the right have been hand made in mild steel, don't match the originals and won't even outlast those which have already been installed for around 100 years.



Original cast iron railings with mild steel railings installed to the right.