

CASE STUDY

Silicone enables equitecture on a colossal scale

The Kelpies, Falkirk, Scotland

PRODUCTS

Dow Corning® 896
PanelFix

SCULPTOR AND DESIGNER

Andy Scott

PRINCIPAL CONTRACTOR

S H Structures Limited

DOW CORNING

TECHNICAL DISTRIBUTOR
Geocel Ltd



Photos courtesy of SH Structures and The Helix Trust

The Project

Officially inaugurated on the 17th and 18th April 2014, The Kelpies are located in The Helix; a new 350 hectare park in Falkirk. They are modelled on heavy horses which were once the powerhouse of the Falkirk/Grangemouth area, working in the foundries, the fields, the farms and the canals. They exemplify the industrial history of Scotland.

Standing at 30 metres in height and one of the largest equine sculptures in the world, each component is formed from steel - a material from Scotland's former industrial heartland, which allows each of the horses heads to exude a mechanized aesthetic.

The full structures are illuminated inside and out creating a stunning spectacle during the hours of darkness, which elevate Falkirk and Grangemouth to national and international prominence.

The £43 million project was made possible by a £25 million award from Big Lottery's 'Living Landmarks' fund and a partnership between Falkirk Council, Scottish Canals and Central Scotland's Forest Trust.

Dow Corning 896 PanelFix was specified for bonding the stainless steel skin plates which were used to clad the horses manes on each of the sculptures.

The Challenge

Following its original inception in 2007 by the sculptor, Andy Scott, the design and erection of The Kelpies required a dedicated team of leading consultants and specialists to bring this new Scottish landmark to fruition. The project was several years in the making during which time a significant effort was devoted to detailed design, planning and creating a bespoke engineering solution, whilst preserving the artist's vision for the sculptures. Of the many technical issues this project presented, the fastening of the external stainless steel skin plates to the primary steel support structure was particularly challenging, due to the different shaped cladding panels and meeting the performance specification as prescribed by the project team.

The Solution

Specialist Steel Fabricator and Principal Contractor for The Kelpies, S H Structures Ltd, contacted Geocel and Dow Corning to identify an appropriate system for fixation of the 0.9mm thick external skin plates, which were comprised of over 100 different shapes and dimensions to replicate the original design aspects of manes of the sculptured horses' heads. Dow Corning proposed the use of silicone bonding with high strength *Dow Corning 896 PanelFix* in combination with the mechanical fixation. This allowed each of the 316 plates to be quickly and securely fastened, preventing vibration and accommodating dynamic wind loads which can give rise to vertical motion, creating oscillations in any direction. The use of *Dow Corning 896* also enabled the curved sections of the panels to be securely fixed to the sub structure.

The panels were installed and bonded by S H Structures using a specific joint detail which was specified by Dow Corning, who conducted a series of calculations prior to recommending a universal design for the adhesive application.

Dow Corning 896 PanelFix

A one part, neutral curing silicone sealant for structurally bonding together common panel bonding materials such as mineral substrates, metals (anodized aluminium, stainless steel, etc). It is highly durable, has immediate green strength directly after application and is able to withstand dynamic and permanent loads once cured.

Dow Corning 896 PanelFix enables high performance bonding of cladding panels that require high strength, durability and fast handling.





“Our co-operation with Dow Corning was vital, not only in enabling the security and safety of each panel but in providing a solution to address long term weather resistance in such an exposed location. This is of the utmost importance which will help realise the 100 year design life of this landmark structure”

David Perry, Contracts Manager at S H Structures



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