

ECS continues support for British Antarctic Survey station



Image courtesy of British Antarctic Survey

The British Antarctic Survey (BAS) has been undertaking scientific research on and around the Antarctic continent for over 60 years. The extremes of weather mean that the various structures used to house equipment, laboratories, workshops and accommodation are continuously being improved and replaced. ECS Engineering Services has been supporting this work by supplying high specification, bespoke steel fabrications each year for the last 20 years.

Structures destined for the Antarctic must be designed to withstand prevailing winds of up to 90 miles per hour and an average external temperature of -30°C with an extreme minimum of -56°C . The most recent addition to the landscape is the iconic Halley VI Research Station that is the first fully relocatable research station in the world.

There is a constant battle to overcome approximately 1.2 m of snow that accumulates each year on the Brunt Ice Shelf, covering and eventually crushing buildings on the surface. To make matters worse, this part of the ice shelf is also moving westward by approximately 700m per year.

The first four research stations have been buried and crushed but Halley V was the first station to use a combination of jacks and stilts to raise the station each year to overcome the accumulation of snow. However, as the station's legs were fixed in the ice it could not be moved and its occupation became precarious, having flowed too far from the mainland to a position at risk of breaking away like an iceberg.

Over the years, ECS has provided a considerable amount of steelwork for the Halley V station and that has led to further work related to the establishment of Halley VI.

Rob Butts, Production Manager at ECS, comments: "We have a long-standing relationship with BAS and we have delivered an increasing amount of work year on year. We use S355K2 grade materials that are impact tested in order to achieve the client's requirements and create the various designs which are then galvanised to 140 microns and in some cases painted as well."

ECS has a long history of working with BAS going back 20 years which has seen them deliver fabricated steelwork, designed and constructed to withstand the very harsh conditions. The more recent construction of Halley VI has included a number of research cabooses, which look like large yellow shipping containers on stilts, and the Turbulence Tower.

BAS provide initial design drawings to ECS where they are turned into fabrication drawings and, following approval, fabrication gets under way in order to meet

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MD's comments

Welcome to the latest edition of the ECS Newsletter.

Since the last edition we have seen many exciting projects taking shape and several of them are outlined in this newsletter.

Our work with FiberCore Europe continues with the first InfraCore road bridge in the UK being installed for the Environment Agency, which is taking a keen interest in this innovative material.

Our combined efforts continue to safely deliver many contracts to a variety of clients and our excellent safety record has once again been recognised by RoSPA with a 7th consecutive Gold Award for Occupational Health and Safety. This is an excellent achievement and one we should all be proud of.

Bob Nix

Bob Nix,
Managing Director



ECS continues support for British Antarctic Survey station (continued)

the shipping date. While the majority of the work is classed as EXC3 under CE certification guidelines, ECS also provides some structures to EXC2 which requires a lower level of quality control and traceability.

This year's work has included 25 lengths of triangular trusses that will make up part of the Halley Tower and a number of leg extensions for the cabooses as well as hinged staircases that can move with the changing snow levels. In addition, ECS will manufacture a number of tower raising frames each year for BAS over the next 4 years.

In total ECS was contracted to deliver nearly 25 tonnes of fabricated steelwork this year, all of which had to be delivered to the UK port in time for the appointed sailing of the vessel to The Falkland Islands, a date that could not be missed.

Top 6 contract wins

Nomenca

Archimedes Screw Pumps for Severn Trent Water. **Value > £400,000**

Environment Agency, Reading

Install fibre reinforced polymer (FRP) road bridge at Mapledurham. **Value > £250,000**

Environment Agency, Anglian

HV Pump refurbishment project. **Value > £122,000**

Thames Water

Beckton STW confined space access renewal. **Value > £95,000**

Temple Lock

Refurbishment project. **Value > £370,000**

Jacksons

Supply and installation of radial gates on the River Thames. **Value > £1,700,000**

Thames lock gate replacement projects completed by ECS



As part of a £1.8 million investment in the refurbishment of a number of its assets along the River Thames, the Environment Agency (EA) has replaced the lock gates at both Romney and Marlow. This complex part of the project was delivered by ECS Engineering Services as a turnkey solution that involved considerable in-house design and steel fabrication work.

The existing lock at Marlow was rebuilt by the Thames Conservancy in 1927 and since then the only improvements have been routine maintenance work and the addition of electrical power to make gate operation easier.

Romney Lock was opened on the present site in 1797 and built of oak, but it was later rebuilt by the Thames Conservancy in 1869 and the weir was rebuilt further upstream at the beginning of the 20th century. The lock was rebuilt again in 1979/80 and currently this structure, along with most of the locks on the River Thames, continues to be maintained by the EA.

The lock gates at both locations had been independently inspected and assessed for the EA, along with several other sites. On the whole, it was deemed that the best course of action was to continue with maintaining the lock gates, but it was considered more cost effective to replace the lock gates at Romney and at Marlow.

Clearly, as a steel fabricated product, these new lock gates would need to be manufactured according to BS EN 1090 and carry the CE certification, under legislation that came into force in July 2014. ECS has achieved the required accreditation which demands

a comprehensive quality system and traceability of all the components within a structure as well as regular training of engineers. With annual reassessments this essential certification also serves as an excellent benchmark that must be met before the EA will award any fabrication contracts.

For specialist projects such as this the EA relies on experienced contractors, such as ECS, that have the skills and the facilities to deliver the complete project, from start to finish. In this case the EA had specified the new gates to be constructed from steel which, with the correct marine protection, would provide a strong and durable solution with a design life of 80 years. Under the current European standards, this installation was classed as EXC2, well within the abilities of the ECS engineers which have achieved certification up to the more rigorous EXC3, which includes buildings and bridges.

Measurements were taken from the original wooden gates and information from historical drawings was used to create the designs for the new steel gates. Of crucial importance were the hinge points and the mitre joint between the gates that must be correct to ensure reliable operation and a watertight joint.

Jamie Wesley, Commercial Manager, Water Control, at ECS comments: "Lock facilities such as those at Romney and Marlow provide a vital service that enables boats to travel along the Thames. Our task is to manage the entire project and deliver a renewed facility with the minimum of inconvenience to the general public.

"To achieve this, the work at both sites was carefully coordinated with our design teams, on-site engineers

and our steel fabrication facility along with several third parties, such as the galvanisers. Our experience in working on large water control structures has proven invaluable in assessing the complications and providing solutions, resulting in a timely completion."

A set of head gates and a set of tail gates were manufactured for each site at ECS's Huthwaite steel fabrication centre before being galvanised. However this was no small task, with the Romney gates almost 6m high metres high and weighing in at almost 10 tonnes per leaf, there was only one galvanising plant in the UK capable of dealing with these sizeable structures.

The gates were hot-dip galvanised, which ensures that the gates were coated both inside and outside, providing long term protection against corrosion and an ideal base protection for equipment that will be underwater for long periods. The Marlow gates were protected using a hot-sprayed zinc in order to achieve the same level of protection.

Jamie Wesley concludes: "The completed lock gates were installed using barge mounted HIAB cranes and a dive team was on hand to assist with the positioning of the gates on the hinges. The final step was to check the seals between the gates and around the sluice doors which was again completed by the dive team, with underwater video used to prove that all was in order.



"ECS has coordinated and managed the entire process from initial design through to the final handover and now the general public can look forward to many years of uninterrupted travel through these locks."



Landustrie Archimedes screw cuts energy consumption by for Welsh pumping station.

Natural Resources Wales (NRW) has upgraded one of its drainage pumping stations with the introduction of a new Archimedes screw pump retrofitted alongside 2 existing axial flow submersible pumps. The project was designed and installed by ECS Engineering Services, UK supply and service agents for Landustrie, with initial energy consumption figures showing a reduction of over 40% compared to the original arrangement.

With responsibilities to maintain almost 2,000 miles of flood defences, main rivers and more than 4,000 sluices, outfalls, floodgates and barriers, Natural Resources Wales has a great deal of involvement in the waterways of Wales. Part of its responsibility is to maintain the drainage systems and ensure that they operate as efficiently as possible.

Under this remit, NRW commissioned ECS to install a new, more efficient, fully compact, Archimedes screw pump at a site near Newport, Gwent. The project also included replacement of the flap valve mechanism,

which ensures a one way flow of the drainage water and can prevent any tidal water from the river Severn from entering the freshwater channels.

In partnership with Landustrie, ECS worked with NRW to design an environmentally sympathetic pumping system that would not only be more energy efficient, but also fish-friendly, a feature not associated with traditional submersible pumping systems.

The pumping station now uses three pumps on a duty / assist / standby basis to maintain the local water levels with the new pump system providing duty capacity. The difference in water levels between the upstream and downstream sections is less than 1 meter which means that the submersible pumps would operate for a short period at regular intervals and so were proving very expensive to run in this application.

The Archimedes screw pump is ideally suited to this application and it is used by many utility companies and government agencies across the UK to provide a cost effective solution for maintaining water levels. By using the screw pump as the primary pump, it can be allowed to operate for longer periods, keeping the

remaining submersibles in reserve in case of greatly increased flows during storm conditions.

The final design used a 1 metre diameter screw located in a compact trough, which was delivered to site as a compact, fully assembled unit. This meant that there was no need to modify the existing concrete structure and reduced the overall installation time.

Due to the nature of the site it was not possible to lower the water levels sufficiently to allow a conventional 'dry' installation. In this type of situation, ECS used one of its certified underwater dive teams to install the sub frame under water which allowed the main assembly to be craned into position and fixed into place. This approach also meant that the local water levels remained unaffected throughout the project.

The Archimedes screw pump is powered, through a variable speed drive, by a 5.5kW motor, connected to a reduction gearbox which enables it to pump up to 0.2m³/second, which is more than sufficient for the normal flows at this station.

**WATCH
THE VIDEO**



**pump
44%**

Initial calculations suggested that the new screw pump should deliver an energy saving of 40%. However, Natural Resources Wales wanted confirmation of this and so the actual energy savings were closely monitored over a 6 month period and compared to the submersible pumping system. The Archimedes screw pump is in fact delivering a 44% energy saving.

Jamie Wesley, Commercial Manager, Water Control Division at ECS, comments: "This project demonstrates just one of the many applications that can benefit from the energy saving design of the Archimedes screw pump. Natural Resources Wales has been very impressed by the real world savings and is looking at installing more screw pumps in similar applications."

The final part of the project was to replace the existing cast iron flap valve with a High Density Polyethylene (HDPE) version designed and manufactured by Waterfront Fluid Controls, with whom ECS also has a partnership. The new flap valve will ensure the complete installation will provide a durable and efficient pumping solution for many years to come.





ECS wins significant fabrication orders for nuclear power industry

ECS is continuing to go from strength to strength having recently won five steel fabrication contracts for customers within the nuclear power industry. Following on from a move to new, larger premises and successful certification under BS EN 1090 for CE marking, the company has now completed the lengthy pre-qualification process to allow production to start on 49 duct cradles for a nuclear plant in the UK.

John Cotterill, Operations Director for ECS, explains: "In all, this project will cover a 6 month period, due to the high standards required by the industry. Before any actual fabrication starts there is considerable work to be done in demonstrating that ECS is able to meet the high quality standards required as well as providing information on the quality management system and the skills of our engineers."

The current project involves the fabrication of 49 duct cradles, which are being used to support sections of duct within the main reactor building. Two different sizes have been specified, one 1800mm and the other 1400mm wide, with each cradle taking around 80 hours to complete.

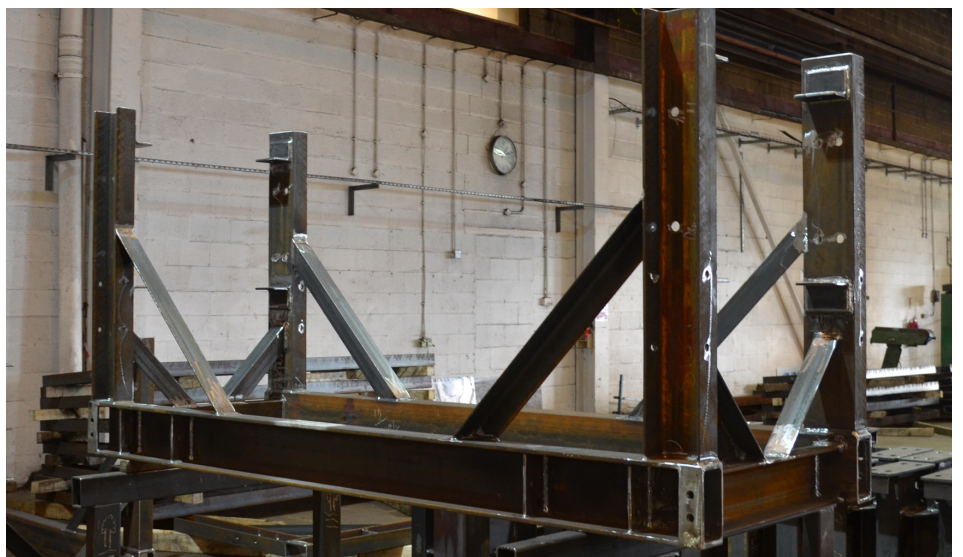
The design consists of a channel framed structure with plate-work supports to ensure that the completed

frame has sufficient strength to carry the weight of the stainless steel duct. Heavy duty castors are used to move the cradles into position, after which they are removed and the cradle is fixed in place.

This project was designated as EXC class 3 under BS EN 1090, which is a classification defined under the CE Marking regulations. When ECS began the certification process it opted for the more arduous EXC3 option which includes buildings and bridges. This means that the quality processes and manufacturing

expertise is appropriate for EXC3 projects as well as all those in the lower classifications.

John Cotterill concludes: "Our new fabrication facility allows the design and drawing offices to be located right next to the fabrication facility, which makes every project as efficient and cost effective as possible. The level of expertise and dedication to quality combined with all the recent changes within the fabrication division have helped ECS to expand into supplying the nuclear power industry."



ECS Engineering Services to improve safety of flood defence scheme

The Environment Agency (EA) has been working closely with the local council and residents of the North Yorkshire village of Skinningrove to improve the flood defences, following two devastating events in 2000. ECS has recently been contracted to further improve the scheme with the addition of linear actuators that will lower a set of bridge railings to prevent the build up of debris during flood conditions.

The current flood defence scheme involves flood protection walls alongside Skinningrove Beck along with flood doors and collapsible railings located on Stone Row Bridge. This system has been tested in flood conditions and has prevented a repeat of the scenes from 2000, but the speed at which the water level rises has given some cause for concern.

Currently, two local wardens are responsible for monitoring the water levels in the beck and, in the event of possible flood conditions, lowering the railings and closing the flood doors. However, in a recent review of these procedures, it was concluded that there wasn't always enough time to safely lower all the barriers before the doors needed to be shut.

This led to a design review and the proposal to automate the lowering of the bridge railings using a control panel located adjacent to the flood doors, which would allow the more crucial task of closing the doors to be completed before lowering the railings. The task of implementing this system was awarded to ECS Engineering Services, which will be responsible for installing and commissioning the automated system.

Marc Jordan, Project Manager for ECS, comments: "This scheme aims to improve the speed of response as well as the integrity of the existing defences and thereby provide better protection for the local community."



ECS to install UK's first InfraCore® Inside FRP bridge for the EA



The Environment Agency (EA) has awarded ECS Engineering Services, one of its framework contractors, with a project to design, build and install a new bridge in Mapledurham, near Reading. As the exclusive UK agent for FiberCore Europe, the proposed design from ECS will use proprietary technology to construct a strong, lightweight and durable structure using fibre reinforced polymer (FRP).

This contract will improve the capacity of the local access routes to the Mapledurham weir and lock complex which will be part of a much larger refurbishment project taking place across a number of sites on the River Thames. The new bridge will replace an ageing structure that has insufficient capacity for modern vehicles.

Jamie Wesley, Commercial Manager for the Water Control Division at ECS, comments: "Using the FRP technology developed by FiberCore Europe has several advantages that will benefit the EA. In the short term, it will reduce the build and installation times, while in the long term it will almost eliminate any maintenance requirements for the lifetime of the bridge, which is expected to be in excess of 100 years.

The location of the bridge is impossible to access with a large articulated lorry so the proposal that ECS has put forward will involve loading the new structure onto floating pontoons and transporting it to the site by river. This process will be made all the easier by the comparative lightweight nature of the bridge compared to a conventional construction.

The installation of this new bridge will provide the EA with greatly improved access to the weir and lock complex and allow vital maintenance work to be completed. The bridge comes with a 50 year limited warranty on the construction and even a 10 year limited warranty on the wear surface, so that EA will have guaranteed access for years to come.

ECS takes RoSPA Gold for 7th year running



ECS Engineering Services has once again been presented with the RoSPA Gold Award for Occupational Health and Safety, the seventh consecutive year that the company has achieved this award. The presentation will be made during a ceremony at the Hilton Birmingham Metropole Hotel, at the NEC on July 15th.

Recognised for setting the standards in safety at work, RoSPA continues to work with all industries to reduce the number of accidents in the workplace through the implementation of better working practices. ECS has

a policy of continuous improvement, with health and safety a top priority and this has been rewarded with the latest accolade.

David Rawlins, RoSPA's awards manager, said: "The RoSPA Awards encourage improvement in occupational health and safety management. Organisations that gain recognition for their health and safety management systems, such as ECS Engineering Services, contribute to raising standards overall and we congratulate them."

Bob Nix, Chairman at ECS, comments: "This award is a great endorsement of our commitment to health and safety, which is driven by our management and

implemented by every single employee. The great majority of our resources are in-house, which allows us to maintain our high standards.

"Working directly with the majority of UK Water Utilities and government agencies, such as the Environment Agency, The Coal Authority and numerous Internal Drainage Boards, ECS demonstrates its ability to work to the highest health and safety standards on a daily basis. This forms a crucial part of our company's offering that enables our clients to be certain that every project will be completed to the highest standard."

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ECS

Engineering Services 

ECS Engineering Services Ltd

T: 01773 860001

E: info@ecsengineeringservices.com

W: www.ecsengineeringservices.com

Water Control  Site Services 
Environmental  Fabrications 