



# Case Study London City Airport



**OUR REPUTATION  
IS YOUR GUARANTEE**



# Company Overview



We are a diamond drilling and sawing contractor that have been trading since 1981.

We have steadily grown over the years and built decade long relationships with many clients.

Our business is based on trust and a commitment to our customers.

We have the most advanced diamond

cutting equipment on the market, consisting of Brokk's, Wire Saws and Track Saws.

With our 70 strong workforce we have the capabilities of completing projects up to £5 m across the whole of the UK.

Below is a brief overview of some of the different services we carry out for our customers.

- Soft Strip
- Concrete Repair & Remedial Works
- All Aspects of Diamond Drilling & Sawing
- Controlled Demolition
- Brokk Demolition
- Hydraulic Bursting & Crunching

- Electrical Chasing, Floors & Walls
- CMS Installation
- Floor Preparation, Grinding & Scabbling
- Starter / Dowel Bar Installation
- Pile Breakdown
- Coring & Structural Testing





# Project Overview



The London City Airport Expansion Scheme is a £480 million project designed to extend the terminal, add seven new aircraft taxi stands and upgraded public transport links.

One of the major elements of work is the new 75,000 m<sup>2</sup> concrete decks above King George V Dock which will sit on in excess of 1,000 new concrete-filled columns.

***This expansion will allow for an extra 32,000 flights by 2025.***



The **main aspect** of the diamond cutting works was to create a rebate into the existing reinforced concrete runway to enable the civils contractor to cantilever the new slab.

The dimensions of the required rebate along the entire length of the existing runway were  
**800 m × 1200 mm × 700 mm.**

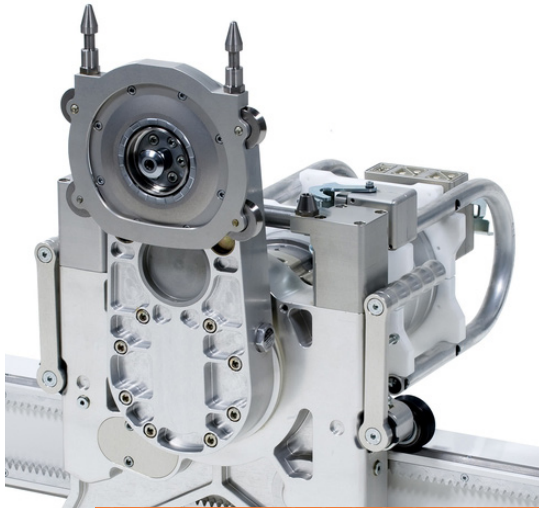
Additionally, a new drainage system needed to be installed along the new runway expansion to allow for the additional surface water.

This drainage system required 11 outlets directly into King George V Dock surrounding the airport.

The dimensions of each outlet were  
**2.3 m × 1.5 m × 1.2 m.**



# Equipment Used



**Pentruder  
8-20iQ 27kW Track Saw**

**Pentruder  
3P8 HF Wire \Saw**



**Hydrostress Hydraulic  
Bursting Machine**

# Complexity of planning & execution



Due to the size and programme requirements of the project we had up to 18 men on site at any one time.



The team was made up from an off-the-tool's supervisor and 2 field supervisors along with skilled drilling and sawing operatives and labourers.

A large amount of senior management time was spent ensuring the job ran smoothly as well as a large input from our Health & Safety department.

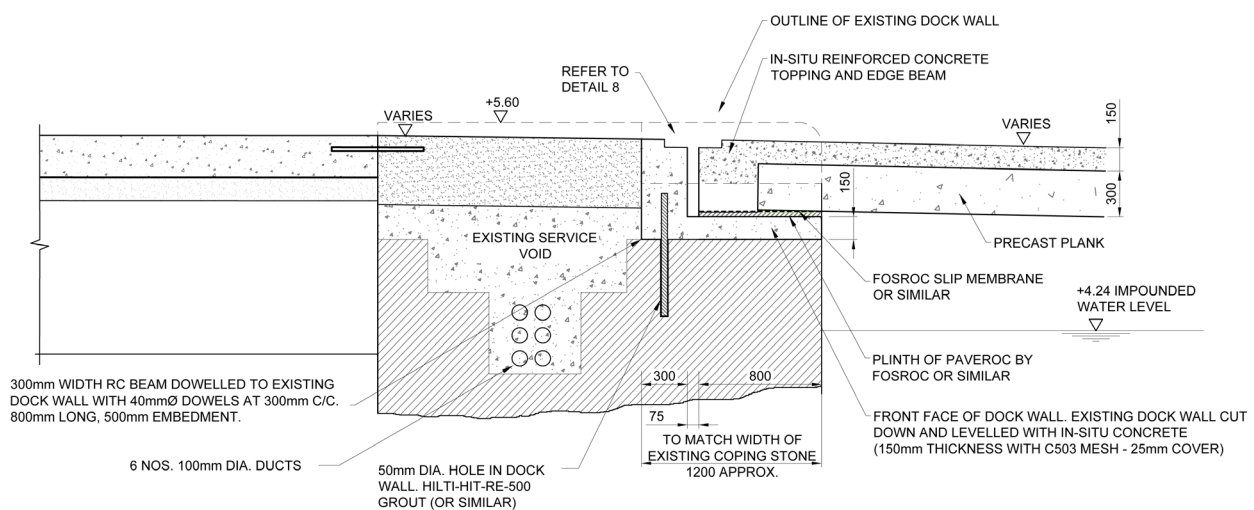
This project provided many challenges but two in particular added another level of difficulty –

both of which would not be encountered in our usual day to day activities:

- 1. Working in a live airport environment and dealing with the restrictions involved.**
- 2. Working on / around water. The whole work area was surrounded by water within the King George V Dock. The only access to the work area was via boat and once in situ works were completed partly from barge and partly on land.**



## View of runway before works commenced



## North dock wall connection detail for standard plank



# Phase 1 of Works

## Diamond Sawing Rebate in Runway



The depth of the horizontal cut required to achieve the rebate was 1200 mm which would only be achievable with the wire sawing technique.

The back of the cut could not be reached meaning that the cut would have to be completed by plunge wire sawing.

This method was ruled out due to the concrete needing to be lifted out as opposed to breaking out.



**Diamond Sawing in action**



**C A Drillers at the London City Airport**

## A NEW METHOD

was derived where we would take the 1200 mm out in 2 no sections which involved completing 2 no 700 mm deep vertical cuts.

The front facing section, now cut into 600 mm × 700 mm, would be lifted, allowing us to set back up on the vertical cut face and complete a 600 mm horizontal flush cut to achieve the total 1200 mm.

Once cut, this would then be released by completing the vertical cut, leaving the final section ready for lifting.



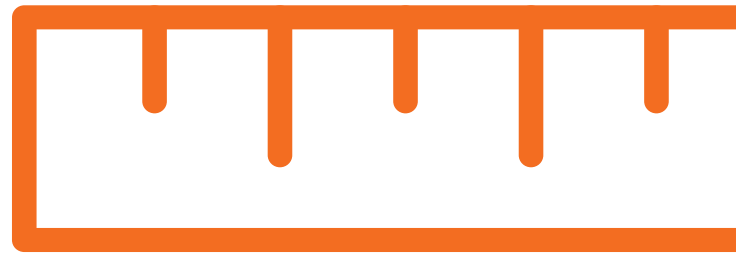
These sections were then hydraulically burst into 4 m lengths weighing 4 tonnes each, lifted away to another barge and transported off site.



**Diamond Sawing**

**The total linear meterage of cutting completed on this work was:**

**1,600 m × 700 mm deep and  
1,600 m × 600 mm deep.**



**1,612  
TONNES!**

**The total weight of  
concrete removed**



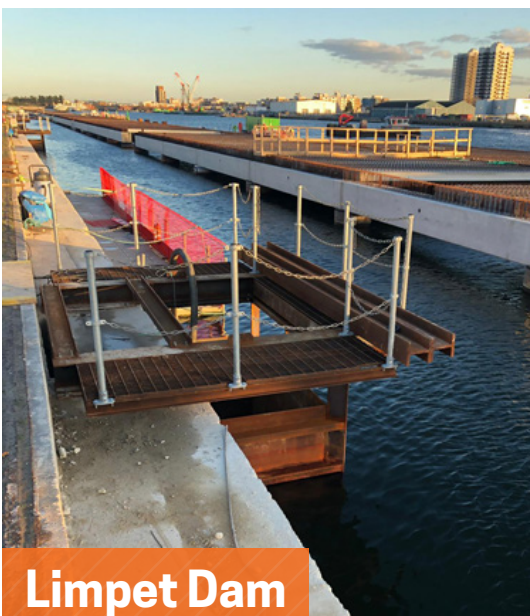
# Phase 2 of works – Diamond Wire sawing & Stitch Drilling to Form Openings for Drainage Outlets



*The Drainage Outlet work  
had to be split into three  
sections with each posing  
a different challenge.*



**Stitch  
Drilling by  
C A Drillers**



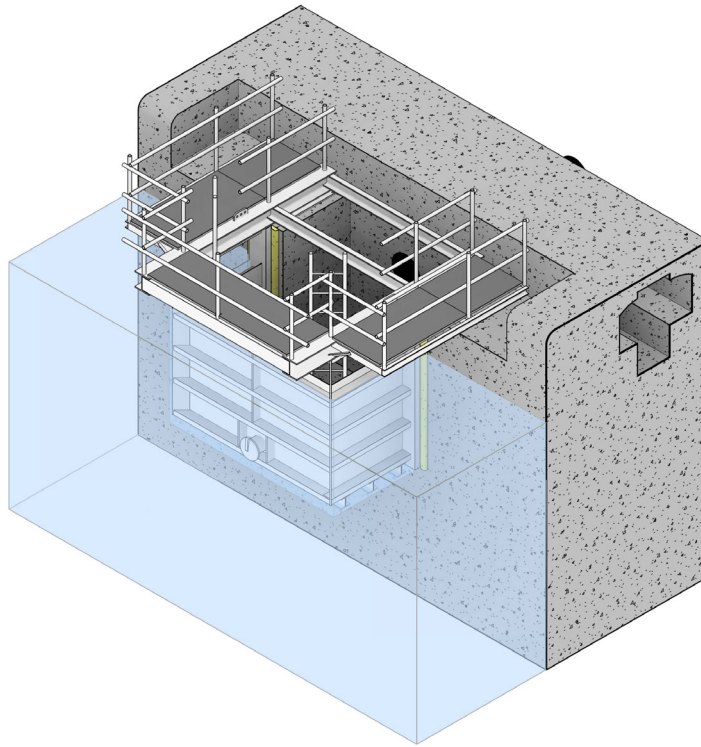
**Limpet Dam  
installation**

## Section 1

**1500 mm × 1200 mm × 1800 mm.**

This had to be split into 3 smaller sections and was achieved by means of stitch drilling and wire sawing. The complex part of this element was the fact that all of this would have been under water if we did not have a Limpet Dam installed.





## Section 2

**2400 mm × 1500 mm × 1800 mm.**

With this area having an existing service void running through the centre and all pipes and ducts being lagged with asbestos we had great difficulty in getting a method approved. A specialist contractor was appointed to remove all asbestos and make the area safe prior to works commencing. Once the area had been made safe to work, we used a combination of plunge Wire Sawing and Brokking to achieve the required opening.

## Section 3

**2500 mm × 2200 mm × 300 mm.**

Although this area seemed straight forward to begin with, the issue we came across was that the section that needed removing was classed as airside and had to be carried out once the airport closed in the evening. This element was carried out on nights and temporarily reinstated at the end of each shift to ensure that there were no delays to the daily operation of the airport.

# Innovative elements



As the project evolved, additional works were required along a 180 m section of rebate where a “dip” was required.

This involved cutting a further 500 mm down which took us 300 mm below the water level.

The methodology of this aspect of works proved difficult due to the complications involved of cutting under water.

After working closely with the contractor and the Airport itself we arrived at the idea of lowering the entire water level within The King George V Dock.

## **C A Drillers' innovative technique**



This was no mean feat and a solution that was very short term due to various implications.

With the water level reduced, 24 hour working had to be introduced to complete the cutting within the enforced time limit, before the normal water level had to be restored.





## Simultaneous Diamond Sawing



The other innovative element of works was achieving the daily meterage required per day. Due to tight programme restraints revolving around the piling contractor **80 linear meters of cutting (600 mm / 700 mm deep)** was required on a daily basis. To achieve this programme, we had to look at installation of **40 meters of track at a time with 2 no saws running simultaneously**. All of this achieved by working from a **barge** and carrying out strict water control (detailed further within quality specifications).

Additionally, we were instructed to diamond drill **2,800 no 50 mm holes** to a **depth of 500 mm** to allow the main contractor to resin in steels to allow the connection for the cantilever slab.

# Quality Specifications



Our biggest task with regards to quality was the control of the waste water / slurry.

Huge amounts were generated on a daily basis and for environmental reasons this could not be allowed to contaminate the water within The King George V Dock.

Our cut line was 200 mm above water level making this incredible difficult especially as we had to contend with working from the barge which was constantly moving.

Our other issue was that the protection we used had to be able to be removed on a daily basis to allow for the night barge to come in and lift the cut sections of concrete.



The final method utilised was to install a 150 mm steel guttering system below the cut line.

The system was installed in 20 m sections in either direction with a very slight fall into a specially fabricated container.

The waste water / slurry was then pumped into 1000 litre IBC containers located on the barge which were taken away each evening to be recycled through a silt buster.



# Summary



We are proud to have completed such a large project on time and on budget. It took a huge effort from the entire team and couldn't have been achieved without full commitment from top to bottom.

Special thanks goes out to **Pentruder UK** whose back up throughout the project was second to none. Each Pentruder 27 kW Tracksaw was cutting through **40 m of 700 mm deep concrete per day** and we don't believe that there is a more powerful saw on the market that would come close to this performance!

We are now concentrating our efforts on assisting the final stages of the Crossrail project and looking forward to making a start on HS2!

