

BIRCO

DRAINAGE
IN ITS BEST FORM

Drainage at Airports

Finding the optimal solution through
experience and expertise





Drainage update ...

... on the runway areas at Munich Airport with 5.6 kilometres of the specially designed BIRCOport

Munich Airport is one of the most important hubs in Europe. With 38.7 million passengers, it takes second place in Germany to Frankfurt am Main. During non-stop operation, the surfaces are subjected to the extreme loads. Nevertheless, smooth operations and the safety of passengers must be guaranteed at all times. To enable traffic even during heavy rain, investments are now being made in a new drainage system for the runways. This renovation project entails both high standards and very restricted leeway. BIRCO was able to convince the decision-makers with its specialised knowledge of loads and positional stability and a customised overall design (means static calculation, quality control, completion specifications, logistics, etc...).

Reference object: Munich Airport "Franz Josef Strauß", runways

Product: Approximately 5,600 m of BIRCOport (5 m long channel's elements) with maintenance and cleaning apertures that can be placed in various positions. System in the load class F 900 with special testing as specified by the airport operator..

- + Customised solution based BIRCOport channels
- + Design proven by test results



Well-conceived

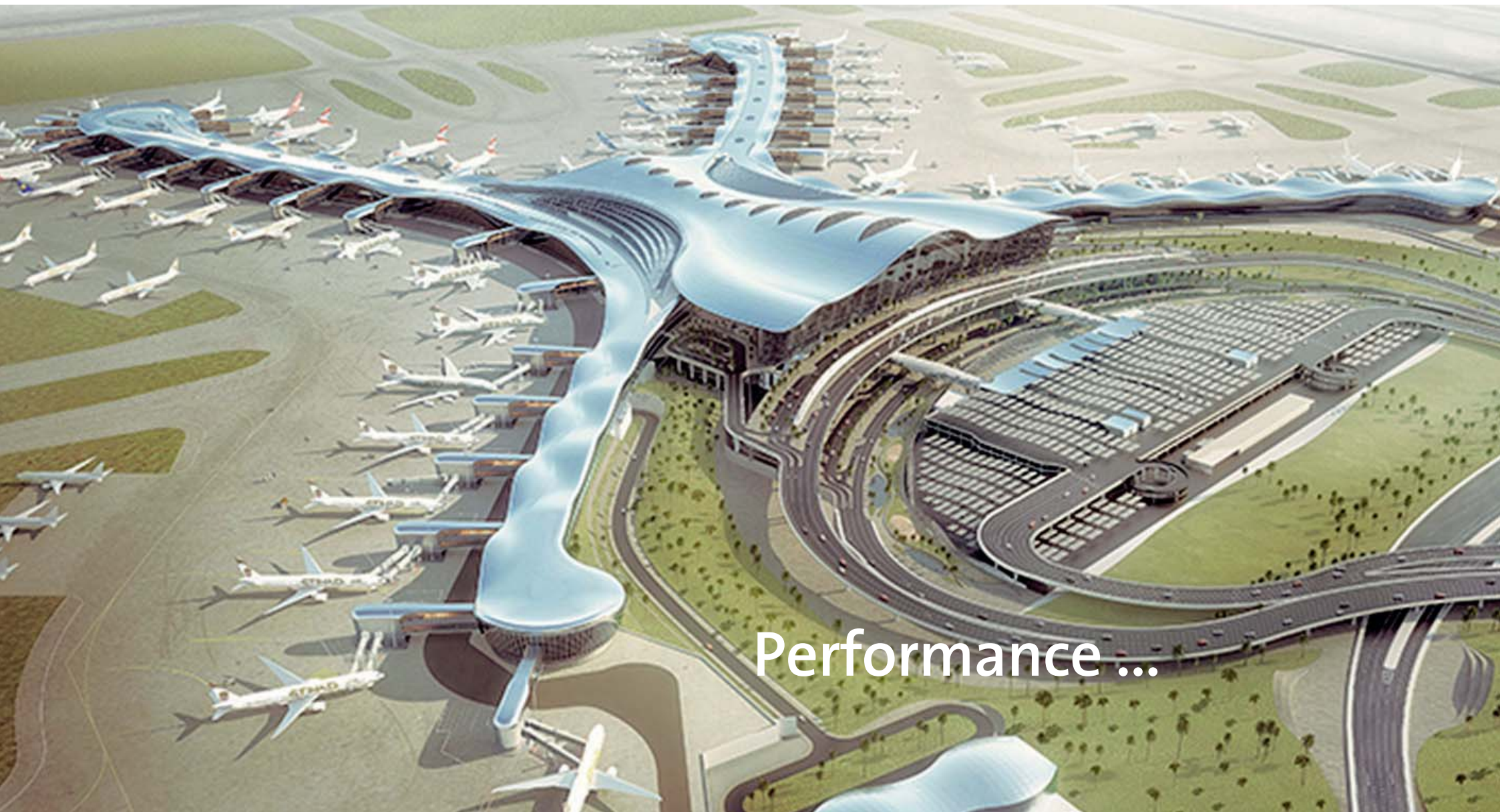
By virtue of its vast experience, BIRCO is in a better position to judge the impact on surfaces more precisely and to design products according to the specific requirements.

Maximum load

Airports and ports meet with the greatest loads, where the material is subjected to enormous displacement forces. Movements between the surface and the channel system must occur harmoniously. In the summer, large areas heat up and expand a few centimetres, while in the winter, the building materials must withstand constant frost-thaw cycles.

MUC





Performance ...

... at the Abu Dhabi Airport in the United Arab Emirates

The second largest airport in the United Arab Emirates is located approximately 100 km away from Dubai and is becoming a competitor to the Dubai International Airport. In the year of the Expo 2020, the airlines Etihad, Emirates and Qatar Airways will have a capacity of 200 million passengers. In order to ensure smooth operation, an efficient drainage system is essential, even in the desert. Both the water from cleaning vehicles, as well as the heavy rainfall on rainy days must be diverted quickly and reliably.

Reference object: Abu Dhabi Airport Extension, Runways

Product: 2,160 m BIRCOsir in nominal width 300,
load class F 900

- + Easy installation
- + Large retention area
- + Highest stability (load class F 900)
- + Widely proven product



Reliability
For international projects, delivery reliability and binding commitments come first. Thanks to its own logistics centre and abundance of international experience, BIRCO stands for on-time delivery.

Quality made in Germany
Our customers appreciate the dimensional accuracy, durability, and pleasing appearance of BIRCO drainage systems. The solid construction can withstand the greatest loads and provides safety reserves when it really matters.

AUH

Installation overnight ...



... fire and ice

Keflavik International in Iceland is the gateway to North America and vice versa.

A logistic challenge was the supply and delivery of 20 x 5 m channel elements – each with a weight of 5 t – 2,600 km across the sea to its destination and installing the units practically overnight in very restricted time windows was the requirement of the customer.

Reference object: Keflavik Reykjavik International

Products: 100 m BIRCOport, class F 900

- + Installation training and service on site
- + Special solution for fast replacement of existing channels
- + Reliable product for airports

- Fast installation progress**
On-time delivery, detailed planning and cooperation with the on-site contractor are required to meet the customers requirements of the installation schedule.

- Service**
BIRCO is committed to support its local partners abroad the whole way from design and planning up to delivery with technical support in the design phase, onsite training and installation supervision as well as in logistics.



KEF



Surface drainage with system ...



... will be done at Dubrovnik Airport by combining BIRCO channel systems and the BIRCO Chambers by StormTech®

The growing importance of the region requires an increase in capacity. To ensure long term operation, the responsible of STRABAG AG (PZC Split d.d.) selected BIRCOsolid slot-channels type Pfuhler. Even larger planes and increasing frequency are no problem with this system in the future.

The high drainage performance of the channel system becomes retention initiated into underground trenches. The BIRCO Chambers by StormTech® are also a safe choice for the highest loads next to the operating areas. The high capacity of the tunnel systems and the compact size of the complete system are convincing. In addition, the open arch form is fully visible and accessible for inspection, maintenance and cleaning.

Reference object: Airport Dubrovnik
Extension of flight operation areas
Fuel Farm

Building time: 2018 until 2019

Products: BIRCOsolid Slot Channels type Pfuhler 30/40
BIRCO Chambers by StormTech® MC 3500
BIRCOsir in nominal width 300, load class F 900

- + High drainage performance
- + Highest stability
- + Decentralized, underground retention

- Channel performance**
High drainage performance and lasting stability.
- Fast construction progress**
By using the 4-meter channel elements, the timetable and the reduced installation times could be kept trouble-free.
- Safe retention**
The near-surface drainage, coupled with the powerful BIRCO Chambers by StormTech®, make for a powerful overall concept even during heavy rain events. Quick drainage with maximum stability.



DBV



... empowering economic growth in Estonia

Expected growth rates in passenger handling and arriving aircrafts in the future at Tallinn Lennart Meri led to a major investment at the largest airport in Estonia. Landside and airside expansions have been on the way since 2017 and included a renovation of the existing aprons surrounding the terminal building.

By removing the existing defective polymer concrete channel system and replacing it by BIRCO slotted concrete channels the aprons are now fully prepared for the challenges of the future.

Together with a finishing contractor the entire drainage system on the aprons was replaced within defined time of 4 weeks. Fast and easy installation of the BIRCO channels paved the way and ensured a continuous service of the airport operations during this period.

Reference object: Tallinn Lennart Meri

Products: 2,500 m BIRCOpfuhler slotted concrete channels, class F 900 with customized parts / angles parts

- + Installation training and service on site
- + Fast installation
- + Reliable product for airports



□ Service

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Total organisation ...



... on the runways of the Roland Garros Airport on the island of La Réunion / Indian Ocean

The wonderful island of La Réunion charms thousands of tourists from around the world. Especially in this tropical climate, heavy rain showers are the rule. In order to attract even more visitors in the future, plans were made to have the airport conform to the dimensions of the A380. As a result, it was arranged to use the BIRCOsir channel system in the nominal width of 500 to provide for rapid drainage of water masses at central locations. The system furthermore meets the high standards for enduring safety and ongoing exposure to the heavy loads of large passenger aircraft traffic. The special feature of this project was the production of the channel bodies on site. Technical training/coaching and moulds from Germany, a local professional partner company, an importer in charge of the coordination to ensure quality and dimensional stability – through these efforts and scrupulous project management, it was possible to complete this project successfully in a short period of time.

Reference object: Airport “Aéroport Roland Garros de la Réunion”

Product: Approximately 1,300 m BIRCOsir with the nominal width 500 and cast slotted ductile iron gratings with load class F 900

- + **Production with German specialists on site (delivery of moulds, frames and gratings)**
- + Channel system with high retention volume
- + International project management
- + Faster construction progress



Standards
No matter which part of the enterprise is involved, they all share an ISO 9001 certification process, which guarantees the quality and, ultimately, your safety. BIRCO is constantly developing new products that meet the most rigorous standards. And often, BIRCO exceeds these standards.

Practical
BIRCO is committed to providing the contractor and the builder products that will stand up when put to practice in the field. Rely on the stability of concrete products in civil engineering.

RUN





Sustainable & environmentally friendly ...

... because the drainage system can not only accommodate the highest loads, but also, in winter, it can collect the accumulated de-icing fluid separately and divert it independently from the rainwater

The Amsterdam Schiphol International Airport used BIRCO to realise a drainage concept that can handle large amounts of water quickly. Through the use of parallel channel lines (BIRCOprotect and BIRCOsir), water contaminated with de-icing fluid and unpolluted water are drained off separately.

With an average elevation of around three meters below sea level, this airport is Europe's lowest laying airport. For this reason, the channel elements were fitted with adjustable feet so they could be adapted to the low installation heights. The spaces between the channel bottom and the bedding were then filled with a concrete mixture.

Reference object: Amsterdam Airport Schiphol International runways

Product: Approximately 7,000 m
BIRCOsir NW 150 to 500,
BIRCOprotect NW 300, cast slotted grating

- + Highest drainage rate with the highest safety standards
- + For the drainage of heavy-duty surfaces (load class F 900)



- Safety**
Cut-off devices permanently connected to the channel bodies ensure that the backflow capacity of the channels can be utilised. Also de-icing fluids, with which the aircraft are sprayed on cold winter days, are diverted separately into the channel system independently of the rainwater.

- Groundwater protection**
Certain areas of the airfield where groundwater pollutants are handled were equipped with channels featuring special sealing joints. The sealant used remains elastic throughout the joint so that it can compensate for induced expansions and settlement.

- Low installation depth**
The channel elements were equipped with adjustable feet (mounted on the side of the channel body). Thus, the channels could be adapted flexibly to various installation depths.

AMS





Other references ...

Frankfurt am Main Airport, apron terminal 3

Fraport, winter maintenance

Munich Airport, apron area ramp 3

Munich Airport, taxiway maintenance hangars

Cologne Bonn Airport, apron A

Fedex, Cologne Bonn Airport

UPS extension, Cologne Bonn Airport

Dusseldorf Airport, airplane hangar 7

Dusseldorf Airport, runways

Dusseldorf airport, baggage handling systems

Berlin Schoenefeld Airport, apron and runway

Stuttgart Airport, tank farms

Hamburg Airport, apron 4

Hamburg Airport, de-icing A380

Airbus Hamburg, Beluga hangar

Frankfurt-Hahn Airport, tank farm

Frankfurt-Hahn Airport, apron Ryanair

Dresden Airport, retrofitting, ramp 2

Ramstein Air Base, air freight terminal

Eurocopter Donauwörth, airfield 06

Heeresflugplatz Fritzlar, aircraft operation areas

Bremen Airport, tank farm

Paderborn / Lippstadt Airport, tank farm

Karlsruhe / Baden-Baden Airport, de-icing north

Berlin-Tegel Airport

Speyer Airport, concrete surface renewal

Spangdahlem Air Base

Leipzig-Halle Airport, new hangar

Hannover-Langenhagen Airport, apron hangar 16

Airbus Stade, hangar 60

Munich Airport, maintenance work slot channels apron

Berlin Brandenburg Airport, ramp 1

Berlin Brandenburg Airport, apron area A

Berlin Schoenefeld Airport, replacement of grid channels

Frankfurt am Main Airport, fire station

Frankfurt am Main Airport, main drainage system

Munich Airport, restoration apron 1

Berlin Brandenburg Airport, ramp 1

Berlin Brandenburg Airport, apron A

Berlin Schoenefeld Airport, exchange box channels

Fraport, fire station

Fraport, airway 18

Aeroport Nice, Terminal 1 and access area

Bordeaux Airport Merignac, airmail area alpha

Aeroport Aurillac, taxiway

Airport Dubrovnik, apron south, east, west and fuel farm

Göteborg Landvetter Airport, terminal Tallin

Keflavik International Airport, terminal



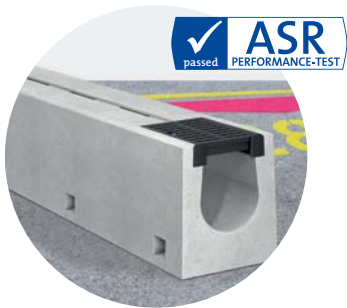
Maximum load capacity, maximum environmental protection

Sustainable systems in all respects for airport operations



BIRCOsolid grid and slot channel systems | Optimum seal – greatest stability

- + Grid and slot channel systems can be combined
- + Mildly aggressive media and extremely heavy-duty areas
- + 4 different nominal diameters / channel types
- + Fewer joints thanks to 4-meter long channel elements
- + Outfall units in every nominal size
- + Easy inspection of the joints through the grid covers
- + Structural advantages for difficult undergrounds
- + Delivered as a system: channel with outfall unit



BIRCOsolid slot channel type Pfuhler | with and without integrated foundation

- + Resistant to mildly aggressive media, such as petrol and mineral oils
- + Ductile iron cover and ductile iron frame with sash lock as a control opening
- + Highly elastic, easy to inspect sealing joint in accordance with KIWA



BIRCOport | The special channel for air operations areas

- + 5-meter long channel elements
- + Installation without foundation beams
- + Monolithic reinforced concrete body (C50/60)
- + Visible expansion joints
- + Static approach of the construction project



BIRCOsir | Stability and Diversity for heavy-duty applications

- + Large width for heavy rainfall
- + Permanent high stability
- + BIRCOhyperbola design and special sealing gap for professional grout
- + Planning- and factory service for complex installation plans



BIRCO Chambers by StormTech® | System for retention and decentralized infiltration of rainwater

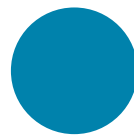
- + 5 different sizes
- + Officially approved (DIBt No. Z-42.1-525)
- + Planning service by BIRCO, large volume – low weight, stackable – transport with fewer trucks, quick and easy installation – no clips and connectors, support on construction site, welding-service, easy to maintain

Individual. Reliable. Dependable. As one of the leading manufacturers of channel systems in Europe, BIRCO develops and designs innovative drainage solutions.

- Heavy-duty**
Products and know-how all around drainage.
- Environment**
Drainage solution for areas where water regulations apply.
- Landscaping**
Drainage solutions for landscape designing.
- Design**
Attractive drainage for domestic and commercial projects.
- Project Management**
Designing, technical assistance and calculations tailored to your product.



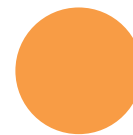
Heavy-duty



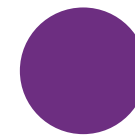
Environment



Landscaping



Design



Project
Management



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