



TRAVEL JOURNAL -
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RCEA - Copenhagen trip 2013



Copenhagen Airport

I love the Copenhagen Airport. It is definitely one of the best airports I have ever visited - when it comes to shopping. The airport has won the prize for best airport in the world and in Europe several times, so there is something about it.

At Copenhagen Airport you find all the great Danish and international designers such as By Malene Birger, Georg Jensen, Gucci, Burberry, InWear, Tiger of Sweden and many many more. You also find the famous Copenhagen cafe Joe and the Juice, and the airport is actually the only place in Denmark where you find Starbucks.

Another thing I like about this airport is the architecture. Copenhagen Airport is a classic example of Nordic architecture based on simple and functional design. The airport is beautiful and it is indeed functional.

We arrived at the hotel in the late evening and got our room straight away.. It's situated next to the main train station in Copenhagen, and its "colourful and lively". It is perfectly located near everything you need (transportation, restaurants, pubs, shops, etc).

This is my first time visiting Copenhagen, but I loved it so much that I am already considering working there! Maybe it was the sun, which was out all the time, but Copenhagen really felt like the perfect city to live in. Bikes are definitely the best, fastest and cheapest way to get around Copenhagen. Forget about cars. They are so ridiculously expensive in Denmark due to high taxes, and very few young people have them.

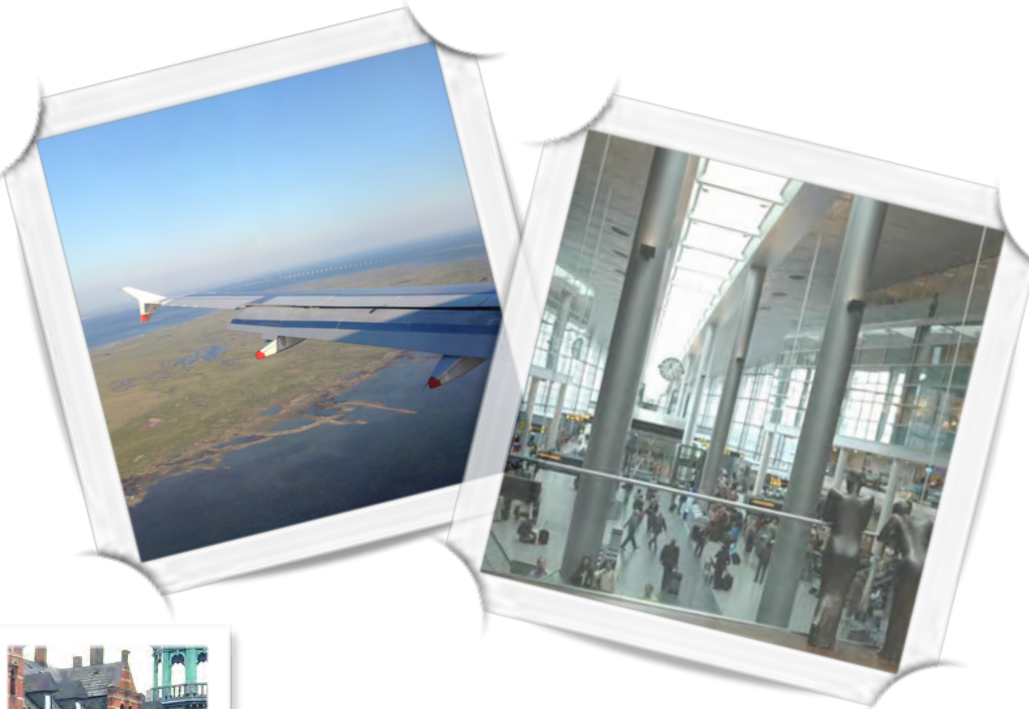
Copenhageners use their bike for transportation every day whether they are going to work, to dinner or out partying in the night. High heels on a bike is not a problem. Neither is a suit or an elegant dress. Rain and snow? Copenhageners don't fear anything.

Copenhagen has a great sense of space: there are boulevards, parks and gardens, waterfront promenades and a beautiful harbour. Most of all, everyone cycles and simply looks very relaxed and laid-back.



First dinner - Pizza time

We ventured out to The Dubliner to meet the others. We noticed most of the pub will still be opened until mid night. We went to a pizza place to have our first dinner with beers. With so many great restaurants in Amagertorv, it felt like a missed opportunity, but 8 of us finally get together and had so much to chat about the trip tomorrow!



Copenhagen Metro (Metroserve Lars Toft Krag)

Metro Service

We were invited to the Metro Service for a presentation of the new extension. We were briefed about the daily service and see how the stations and the driverless trains are being controlled. We were also lucky enough to visit the control room.

During the tour around workshop, we were showed how the Metro trains are being washed and repaired.

Summary of the Copenhagen Metro Design

Awards

2008 - World's Best Metro
2009 - World's Best Driverless Metro

New extensions

The fourth phase of the Metro in Copenhagen - it is expected to open in 2018.

Consist of 17 stations that covered major parts of Copenhagen. A round trip is expected to take 23 minutes.

Metro Stations

Design is based on idea of giving the passengers access from street level to platforms.

The fundamental design elements are kept in classic, functional Scandinavian to balance the links between the existing city and new Orestad.

The Metro has 22 stations, 9 of which are tunnel stations. 12 km of the line run on embankment or elevated railways while 11km are underground.

Escalators

There are two escalators going up from and two down to the platform.

Skylight

The daylight shines into the station and down on the platform 20m underground (typically).

The daylight is enhanced by using daylight reflectors and aluminium panels, the prisms.

M&E

ATC - The driverless Metro is operated by automatic technical systems, which ensures the trains arrive and depart at the right place, open and close doors, travel at correct speed and distance.

SCADA - monitoring system for all equipments on all stations.

Obstacle detection system - either infra red rays or laser beam scanner which provide security when something or someone falls on to tracks.



Cityringen Metro - Site Visit

The project includes 17 box stations, five shafts and four crossovers. The line is to come into service in 2018.

The geological structure of Copenhagen is basically composed of limestone with different layers of glacial layers. The running tunnels are to be driven in EPB mode at the depth of 15m to 35m. The inner diameter of the tunnel is approximately 5m.

Stations

The underground stations will be cut and cover box structures of 64m by 22m wide with a 9m island platforms situated at approximately 20m below ground level.

The principle design will be based on the existing stations, daylight will reach the platforms from openings at street level.

Challenges

Existing structures - some stations will be situated beneath existing buildings, some are heritage and expensive residential.

Groundwater / settlement - first priority for monitoring.

Interface of soil conditions - TBM will be required to operate in full ePB mode at all time

Crossings -The new alignment also passes above the existing metro line and and under the famous Marmor Kirken in Copenhagen.



Norrebroparken

During the site visit to the station, I noticed there were loads of different work activities involved on site, including the following:

Demolition - heavy excavation (~45m below ground level) for all box stations work.

Temporary works - Large scale of propping shoring system.

Lifting - including steelwork for shaft and all equipment



Sonder Boulevard

The new station is being constructed using 68 numbers of diaphragm walls panels (1.2m thk), these are installed up to 28m below ground level to form a 15m wide and 90m long. It roughly takes 3-4 days per panel.

The site is very closed to residential properties, extra precautions were taking in place. For examples, plants and structures being covered to protect the are from pollution rather than noise and use. Monitoring system has been installed to warn the pollution levels when reach the triggers.

Platanvej

The cutterhead was shipped to the Platanvej site the day before our visit and the machine will be arrived over the next four weeks.



Great Belt Connection. Oresund Connection. Femern Connection.

The next day we were invited to Femern for a informative presentation about three numbers of railway or road bridge connections through Denmark to parts of Europe.



Project cost: DKK 21.4 billion (1998 prices)

Crosses: Storebaelt

Opened: 1998

Function: Road bridge

Design: suspension bridge



Project cost: 5.7 Billion EUR

Crosses: Oresund

Opened: 2000

Function: Road bridge and railway bridge

Design: cable-stayed bridge

Longest span: 490m (54 no. of spans in total)



Architects and engineers worked together to complete the design and technology to create bigger, better and more spectacular than ever before.

The presentation have proofed to me that three of the connections reflects the environment around the cities, and they all related and fit to purpose to form part of the landscape.



Femern Connection

Project cost: 5.5 billion EUR.

This a fixed and direct link between Scandinavia and Central Europe. The crossing is approx. 19m wide and will be opened in 2021.

It is designed as an immersed tunnel and will be expecting 110km per hour on the motorway. The

Oresund Bridge - The connection between Denmark & Sweden



During the flight to Copenhagen, I saw a very extended long bridge, which stopped randomly by a relatively small island. I was waiting for nearly two nights before I had a chance to physically to get on the bridge. I kept dreaming about this "magic connection" until I heard about it in the presentation in the morning and finally got on board on the last day of my visit the city.

The Oresund Bridge is the bridge that connects Amager and Oresund in Denmark with Skane, Sweden, in a total length of just over 10 miles. This is the road and rail connection between the metropolitan areas of Copenhagen and Malmo.

The Oresund bridge structure includes a bridge, a tunnel and a new island where we went from tunnel-level (on the Danish side) to the level of the bridge.



The western part of the Oresund Link is a 4km-long tunnel between the artificial island of Peberholm and the artificial peninsula at Kastrup. The tunnel is the immersed tube tunnel for both road and rail traffic. It consists of 20 tunnel elements.

The artificial island of Peberholm was built in order to transfer the traffic from the immersed tunnel up onto the approach bridge. Peberholm is approx. 4km long and mainly made up of dredged material from the Oresund seabed. A total of 1.6 million m³ of stone and 7.5 million m³ of sand and dredged material were required for its completion.

The toll for driving across the Oresund bridge is paid at the toll station on the Swedish side. There is no border control as both Denmark and Sweden are part of the European Union.



Last but not least.....

Beers and food..... And wrapped up with a fantastic boat trip!



To all RCEA Copenhagen 2013 members, thanks for making my first trip to Copenhagen so amazing. I feel extremely lucky to have been surrounded by such knowledgeable and fun people who helped make this journey so special. - Stephanie Wong



When visiting Copenhagen you absolutely must take a ride with the metro. I find it fabulous. You get around the city in no time. The design is fantastic and the best is driverless. I like sitting at the front and I feel as if I am on a roller coaster. Despite the depth of the underground stations, skylights allow natural light to filter through to the platforms.

The metro is the easiest way to get to and from the Copenhagen Airport. It only takes around 20 minutes from the central.

The underground are massive, significantly clean and not crowded. The train go so frequently that you don't need to check the schedule.

