



## NEW DOHA INTERNATIONAL AIRPORT - QATAR (NDIA)

### CARGO WAREHOUSE & ANCILLARY BUILDINGS

PROJECT BUDGET: 180.000.000 \$

### AIRCRAFT MAINTENANCE HANGAR

PROJECT BUDGET: 740.000.000 \$

CONSTRUCTION: J/V ADCC

STRUCTURAL DESIGN: KANON CONSULTING, INCIDE (ITALY) (2007-2009)



*Aerial View of the NDIA construction site and its ultimate development*

The new airport of the state of Qatar in Doha will be a world-class facility with regard to design and operational efficiency. By ultimate development NDIA will have an annual capacity for 50 million passengers and 2 million of cargo and will have parking positions for 100 aircraft.

Works are currently near completion throughout the airport site. The large-scale construction projects on the site, which is 1/3 of the city of Doha in size, include land reclamation over 40% of the site, earthworks for drainage and airfield and road paving, road tunnel excavation building construction.

**“KANON CONSULTING”** has been assigned to design parts of the New Doha International Airport in Qatar, for which contractor is the **J/V ADCC** (Aktor, Al Darwish, Cimolai, Cybarco).

ADCC has been awarded some of the largest construction packages, such as the main Aircraft Maintenance Hangar, the Cargo Warehouse, the Emiri Hangar and a number of smaller ancillary buildings. The total cost of these contracts is well over a billion US dollars.

Our office involvement partly as a sub consultant to the general designer Ghafari Associates LLC, and partly as a consultant to the contractor J/V, includes the design of all concrete works for the **Aircraft Maintenance Hangar** and **Cargo Warehouse** and the related ancillary buildings.



*Visualizations of NDIA main Terminal*

## CARGO WAREHOUSE & ANCILLARY BUILDINGS



*Cargo Terminal Building - Exterior view at night*

Located in the midfield area, NDIA's cargo terminal will have a capacity for processing 50,000 tonnes of cargo per year, making it amongst the largest cargo terminals in the world.

A main feature of the cargo terminal is the automated storage and retrieval system. Most air freight will be transported in Unit Load Devices (ULDs). The automated system will have the capacity to accommodate up to 1000 ULDs, to find them and process them quickly, thereby ensuring efficient cargo handling.



*Automated Storage System ULD*

Other major areas of the terminal include high-bay storage areas for import and export cargo, work stations for make-up and breakdown of ULD loads, and storage areas for special cargo, such as live animals, hazardous materials, valuable items, cold storage etc. The cargo terminal features a 15 meter clear height inside the building to allow efficient stacking for storage.



*Exterior view of the Cargo Building during steel frame erection*



*Exterior view of the ULD Building during steel erection phase*



*Interior view of Cargo Building*

The Cargo Warehouse is a building of 400x135m plan and 24/27 meter high (total) and consists of the steel Structure of ULD System Building and the steel structure of Consignment Building, which includes also a mezzanine for Offices and Mechanical Areas.

“KANON CONSULTING” is responsible for the design of all concrete works, which include foundations on piles, a fiber reinforced ground slab, and equipment pits.

The soil in the entire NDIA area consists of two main layers. A top layer 4.0-6.0m deep (sea material fill and marine sediment) and a limestone substratum below 6.0m depth.

A total of 720 bored piles with an embedded length into the limestone substratum up to 16m are used.



*Inside the Cargo Warehouse - Steel Columns on a pile cap with pile foundation*

## AIRCRAFT MAINTENANCE HANGAR



*Front and rear view of the Aircraft Maintenance Hangar near completion*

The Aircraft Maintenance Base at the New Doha International Airport (NDIA) will be the central maintenance hub for Qatar Airway's international fleet. Located in the midfield area, it will be capable of holding a maximum of 8 wide body, and 4 smaller body aircraft, including two positions capable of servicing the Airbus 380's.

The Maintenance base will be in the form of a large hangar. The design of its layout and column spacing is focused on ensuring flexible aircraft parking at all times for maximum maintenance efficiency. The hangar will feature mezzanine levels to allow direct access to the upper floors of the aircraft. There will also be floor mounted docks for servicing of aircraft, and overhead cranes to further ease maintenance access and safety.



*Aircraft Hangar -The roof of the smaller hangar has already been lifted to its final position.  
The roof of the larger hangar is still being assembled.*



*Interior view of the 220m long larger Hangar*

The workshop building at the back of the aircraft hangar bays will provide specialised maintenance and automated spare parts storage. This will include specialist workshop areas for the maintenance of engines, avionics, wheels and brakes, structures, interiors, painting, galleys, in-flight entertainment systems and safety equipment. An internal roadway between the hangar and these workshops will ensure quick movement of spare parts and components as needed.

The maintenance hangar is a 482mx185m structure. The hangar and the workshop roofs are sloped. The height of the structure varies from 12m to 45m. The structure is composed of 3 main entities, which are, a **Smaller Hangar** with 180m clear span between trussed columns, a **Larger Hangar** with 220m clear span between trussed columns and the **Workshop area** which includes storage, offices, technical rooms, etc. The two hangars are steel structures. The other structures are concrete buildings.



*Construction of the Workshop Building*

Foundation design included two long prestressed tie-beams which connect the foundation of the main door frame of the two hangars in order to eliminate the horizontal thrust due to the huge load of the roof. A total of 1069 piles have been constructed for all foundations.



*Front truss foundation with prestressing cables for the tie-beam*

"Kanon Consulting" was responsible for the design of all concrete works, which include foundation of the steel roof for the Larger and Smaller Hangar, foundation of the Workshop and office concrete buildings, design of the ground slab, underground pits and galleries and design of all concrete buildings in the Workshop area.