Mr.K.N.Srivastava 5th August 2013
Secretary, Ministry of Civil Aviation
Chairman, Civil Aviation Safety Advisory Council
New Delhi

Attn:

Mr.Arun Mishra
Director General of Civil Aviation

Mr.V.P.Agarwal
Chairman, Airports Authority of India

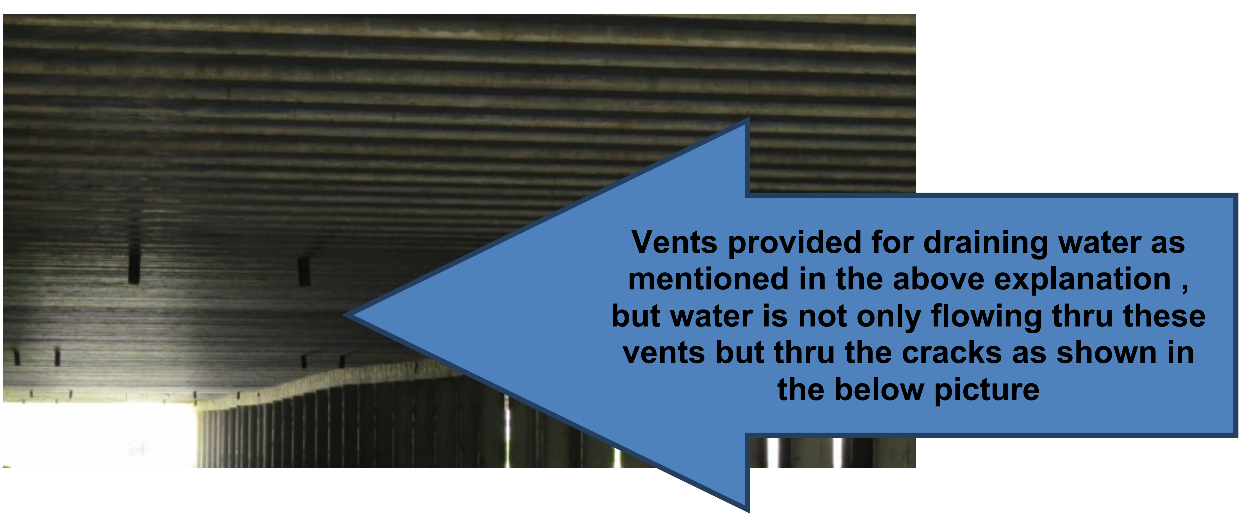
Dear Mr. Srivastava,

Sub: DGCA Clearance for Operations on Secondary runway at Chennai

I had written to you, earlier, on this subject and I have not received any response or acknowledgement. Recently, an official of AAI, Mr.N.Jayakumar had sent this as an explanation on questions raised by residents of houses that are affected by the land acquisition being made on incorrect grounds:

" The bituminous wearing coat is laid over the RCC slab. The bituminous concrete is not water tight concrete, hence water can seep and reach top of the deck slab. This water may damage the bituminous concrete and hence, to drain out the water, weep holes are provided at the deck slab at defined locations. These drains are functioning as expected, As the sacrificial shuttering is provided below the deck slab, the water is seeping through the sacrificial shuttering and falling on the girders. This dampness is not due to any crack or what so ever, as assumed. It is reiterated again that the bridge across the river Adyar was constructed with all the safety margins as per the standard code of practices. The RCC bridge is capable of handling the designed air craft load" .

AAI , and its technical team state that sacrificial shuttering and drain holes for water are provided . This is well illustrated on the picture below .



There are cracks on the beams and deck slabs. These are not water draining points , rather a crack as clearly illustrated , they are RCC steel bars that are exposed and corroded due to premature failure of slab .

I had also written about the comparison with the Funchal Airport at Madeira. I am copying a portion of that letter again:

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the following extracts are from a technical report on the Funchal Airport at Madeira, Portugal:

TECHNICAL REPORT

duratiNet

TR 6.5

CORROSION MONITORING SYSTEMS

3.1.1 Funchal Airport in Madeira Island

Madeira Airport runway was extended by two hundred meters in 1977 after the TAP 727 crash. The length of the former runway of the Madeira Airport was, however, a serious restraint to the development of the island, since only small-medium planes could land. In 2000, it was extended again to a length of 2781 meters. As a result, the runaway became nearly double the length it had been during the 1977 incident.
Because of the local conditions, the solution adopted to extend its length, was to slightly turn the existing runway and to build a bridge, crossing a shallow water bay nearby, 57 meters above the sea level. This new runway extension was built over the ocean. Instead of using landfill to construct the extension, the runway sits on 180 columns that are 70 meters tall. After it was completed, the Madeira Runway extension won the Outstanding Structures Award by the International Association of Bridge and Structural Engineering. This bridge, 1020 metres long x 180 metres wide, was designed to carry the loads of the landing impact of a plane type Boeing 747. Due to the unusually large size of the structure, special care was taken in order to minimise the visual impact of the structural elements.
The structural solution, in reinforced concrete, consists of an array of large portal frames with circular columns and prestressed beams supporting a deck slab bi-directionally prestressed. When possible, direct foundations, through large concrete footings, were adopted. Where the rock formations at surface had no adequate capacity, indirect foundations with concrete piles (reaching depths up to 60 metres) were used.

The huge volume of earthwork generated a surplus quantity of this material, so the area of the bay beneath the structure was reclaimed, which very much facilitated the construction works. Special care was taken on making the embankment, in order to minimise the impacts on the local environmental conditions.

Purpose of instrumentation
To obtain information about the progress of despassivation front in the concrete cover (carbonation and chlorides ingress) in the Madeira runway extension.

Location of the instrumentation

A monitoring system consisting of corrosion sensors embedded with automatic data acquisition was installed.

Instrumentation was installed in 23 areas. The localization of the areas took into account the influence of differential exposure conditions and specific aspects of structural design or construction practices.

Sensors and measurement equipment

Sensors

In each of the 23 areas the following set of sensors were installed:
Galvanic cell - anode ladders type galvanic sensor (GS-AL).
Resistivity sensors – Two graphite electrode resistivity sensors
Temperature – Pt100 thermometer appropriated to be embedded in concrete
Corrosion potential – ERE-Probe reference electrode from Germann Instruments and activated Ti.

Fig. 5. Sensors before concreting.

Fig. 6. Instrumentation of pier.

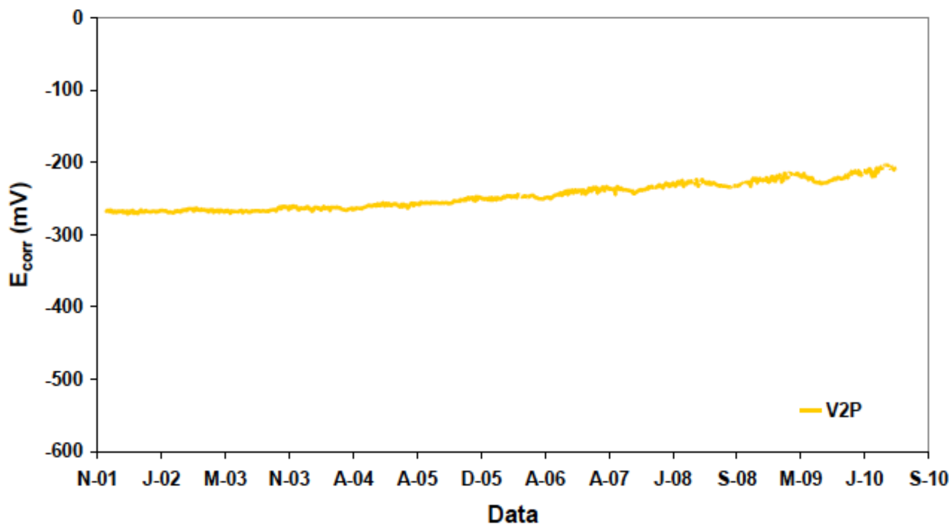
Acquisition data equipment

Datataker 500 automatic acquisition data equipments were installed in centralization boxes. Due to extension of the airport, a centralization box was installed in each pier. A single box receives all information from sensors installed in beams and deck slab.

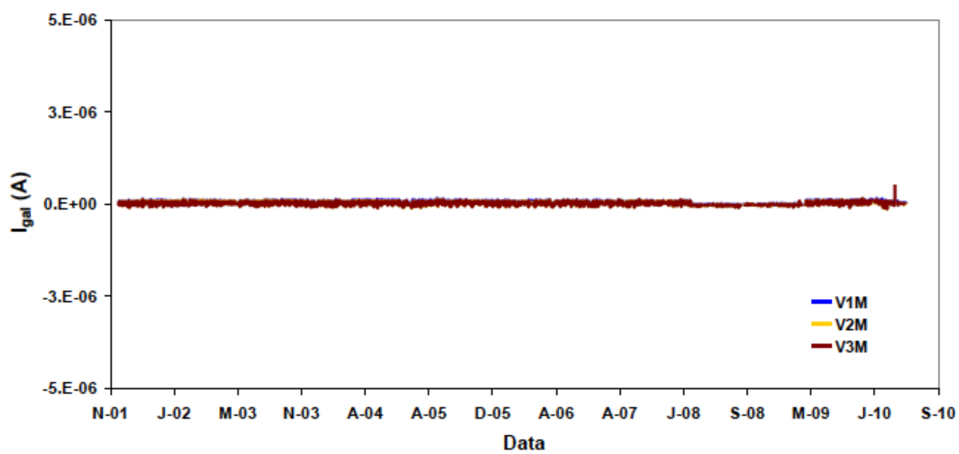
Fig. 7.Centralization box installed next to the airport runway that receives all information from sensors installed in beams and deck slab. Top – during the installation of automatic acquisition of data. Below – ten years after.

Fig. 8. Current appearance of the centralization box installed on a pier.

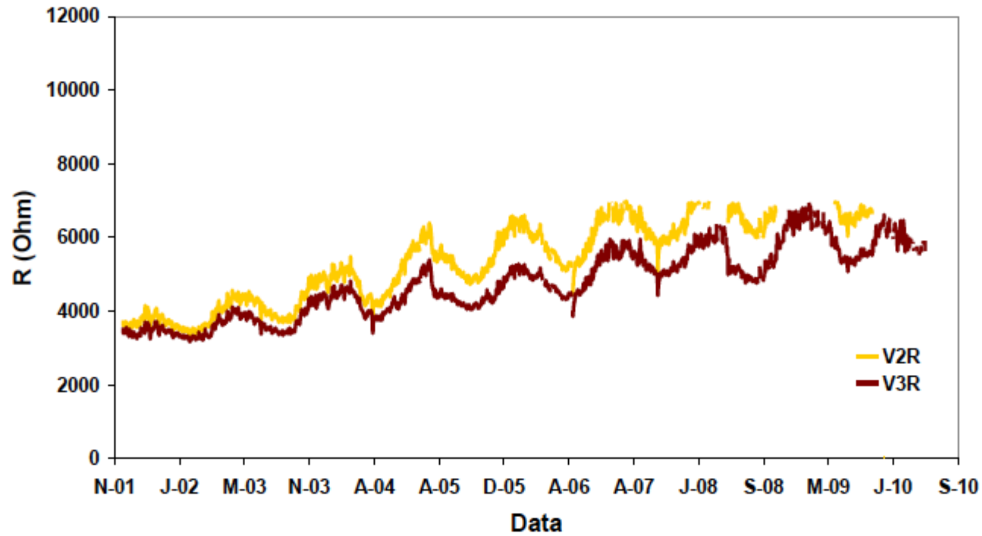
Data management and examples of outcomes
The corrosion monitoring system was installed in 2001 and automatic acquisition of data, with daily periodicity, was provided since then.
Examples of outcomes
Corrosion potential (Ecorr)
Measurement of Ecorr showed that reinforcement corrosion do not start during the monitoring period.

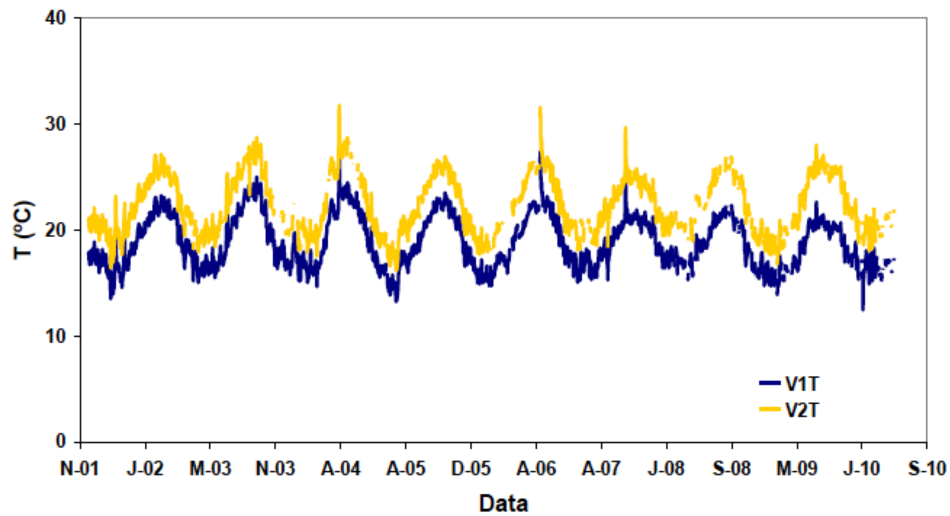


Galvanic Current (Igal)
Galvanic currents measured during the monitoring period are low and indicative that the reinforcement is not corroding.

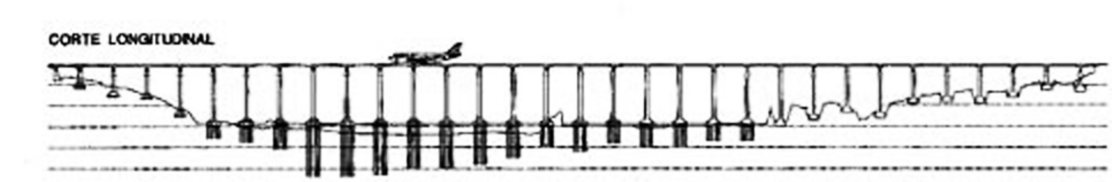


Concrete electrical resistance (R)
No significant changes of R occurred during the monitoring period. R variations have been attributed to the variations of environmental parameters and to the evolution of concrete hydration over time.

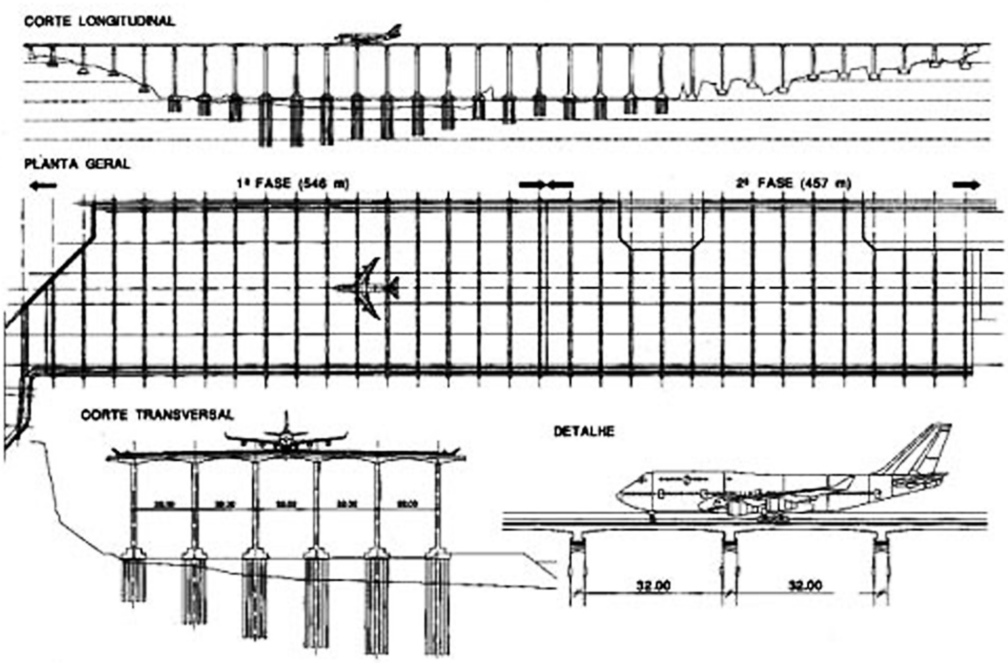




The following images were taken during various stages of the Funchal airport construction. I would like to draw your attention to the following diagram, in particular:



You will notice that the beams are absolutely LEVEL and it is only the supporting pillars (piers) that vary in length to cater for difference in the ground levels. The images taken during the construction will show that the there are no variations in the levels of the beams.


CORTE LONGITUDINAL
PLANTA GERAL
1ª FASE (546 m)
2ª FASE (457 m)
CORTE TRANSVERSAL
DETALHE
32.00
32.00


Funchal runway is more than TWELVE years old. There is no corrosion on the structure and they have installed several sensors as listed above, in the technical report.

Contrast that with what is visible in the Secondary Runway bridge at Chennai that is LESS THAN TWO YEARS OLD:

It is a poorly constructed structure, with visible signs of heavy corrosion and rapid deterioration.

If this structure is declared safe for operation without testing (values purely based on computer simulations), it will be a repeat of the way warnings were ignored by AAI and DGCA in declaring the runway at Mangalore as safe. That folly cost 158 lives.
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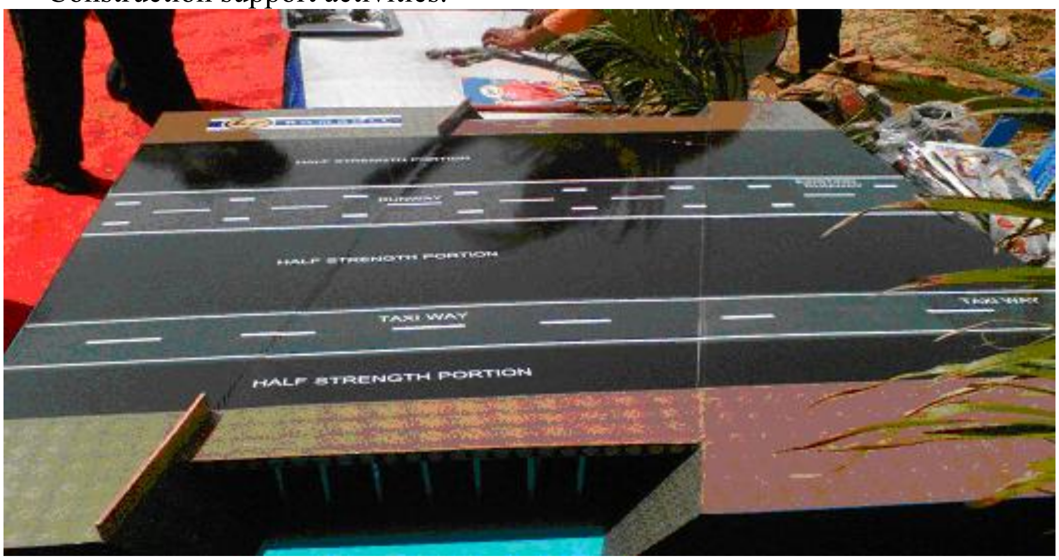
I would like to highlight the Chennai Secondary runway bridge construction from the following link: http://www.ltramboll.com/bridgepg1.:

EXTENSION OF SECONDARY RUNWAY AT CHENNAI AIRPORT, CHENNAI. CONSULTANCY SERVICE FOR CONSTRUCTION OF RCC/PRESTRESSED CONCRETE BRIDGE ACROSS RIVER ADAYAR.
Client: Airport Authority of India, Chennai
Brief Scope and Salient Features:
Consultancy services were for the Detailed Design of RCC / Prestressed concrete bridge across River Adyar. The bridge consists of runway portion, taxiway portion and half strength portion. **The bridge is constructed at the touch down zone of the aircraft.**
The runway portion and taxiway portion is designed for the maximum aircraft load of

A380 airbus. The half strength portion is designed for the 50% of runway live load and for the tanker load. The bridge is of approximately 200m long and 470m wide.

Scope of the project:

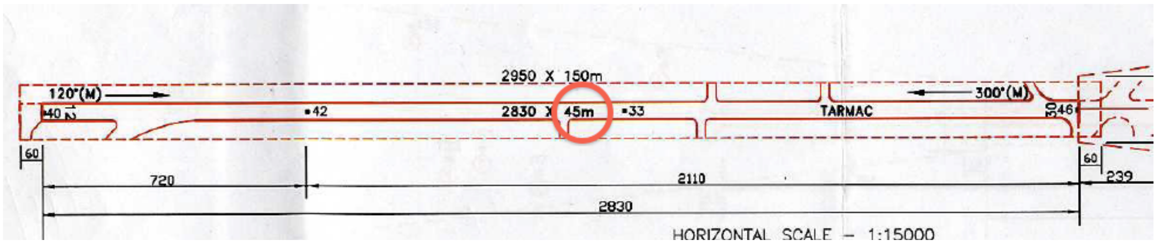
- Hydraulic study ,detailed survey report, hydraulic parameters and hydraulic report.
- Soil investigation and Soil investigation report.
- Structural deigns philosophy, structural parameters, preliminary sizes and estimates.
- Detailed design and drawings for the full strength potion and Half strength potion.
- Preparation of tender drawings, BOQ, cost estimates and specifications.
- Construction support activities.



The construction was not carried out by L&T who have considerable experience in Bridge building but by a company CCCL, who have not even constructed a road bridge. Please note the images during construction and compare them with the Funchal airport bridge:


CCCL


There is NO EVIDENCE of sensors being inserted in the construction stage, which is very essential for a structure that is going to take the load of aircraft landing and taking off.
I would also like to draw your attention to the Type A Obstacle chart issued by AAI in 2013 for Runway 12/30 at Chennai:



The runway width is 45metres. Airbus A 380 requires a Code F runway which should be 60m. Please note the salient features given by L&T:
The runway portion and taxiway portion is designed for the maximum aircraft load of A380 airbus. The half strength portion is designed for the 50% of runway live load and for the tanker load.
The bridge was constructed after ICAO had brought out the Code F standards. Is it safe for A 380 operations as claimed by AAI. When L&T state that the design is for a "aircraft load of A380 airbus", have they catered for a 2g landing as well as the twisting forces that can occur during a cross wind landing? I am copying the questions that I had raised with the Structural Engineering department of IIT Madras who were asked to validate the findings submitted by AAI:
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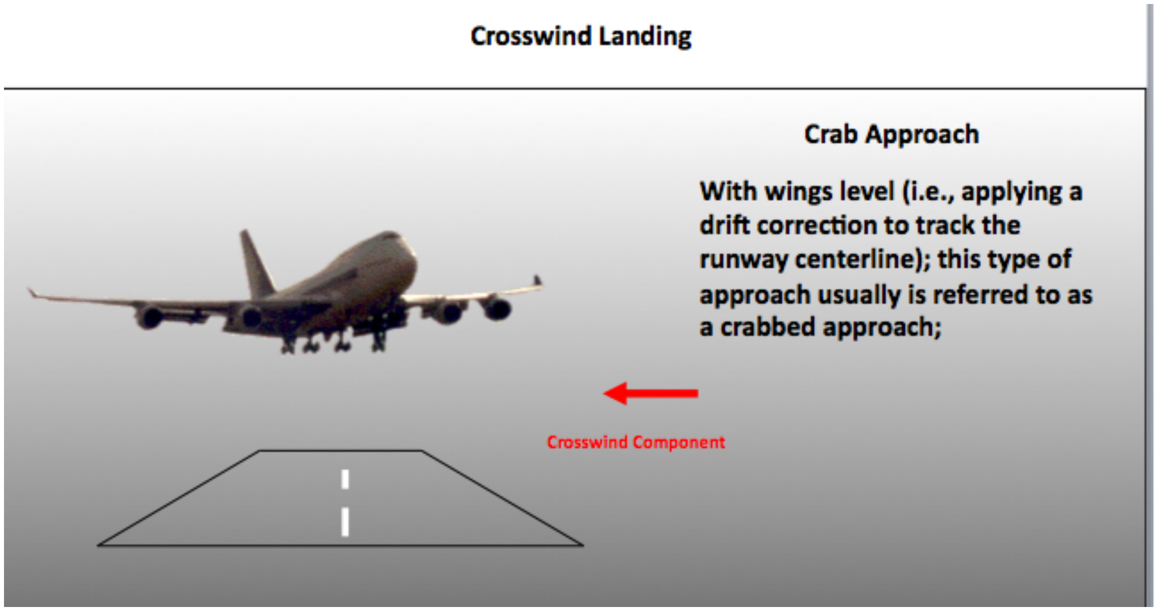
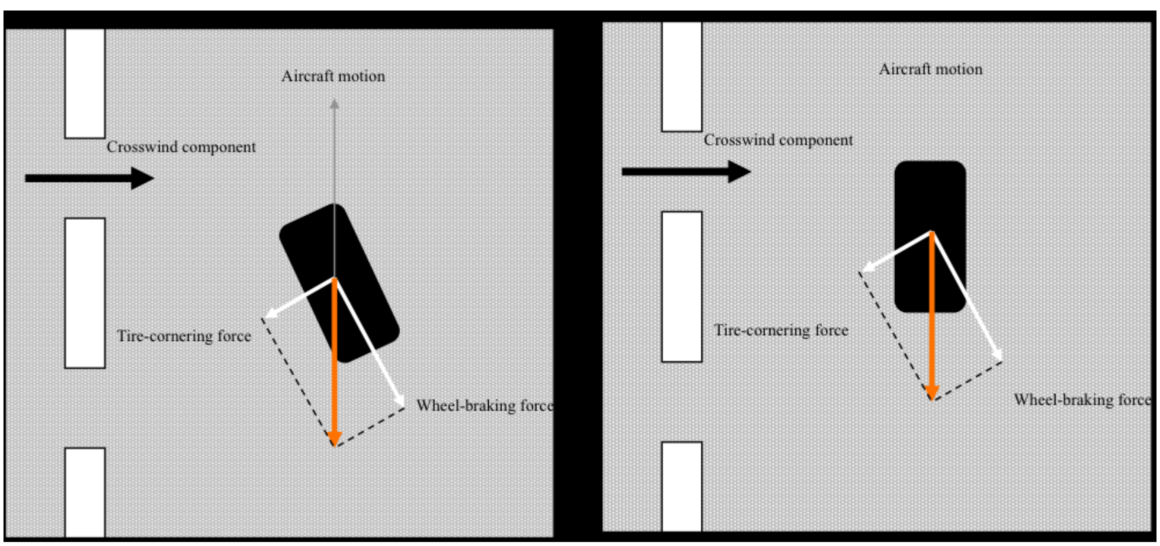
A Hard crosswind Landing of a B 737, which could be upto a magnitude of 2.1g

For a wide body aircraft, the touchdown angle may be as high as 40 degrees offset in strong cross winds as the Crab Approach is the recommended technique.



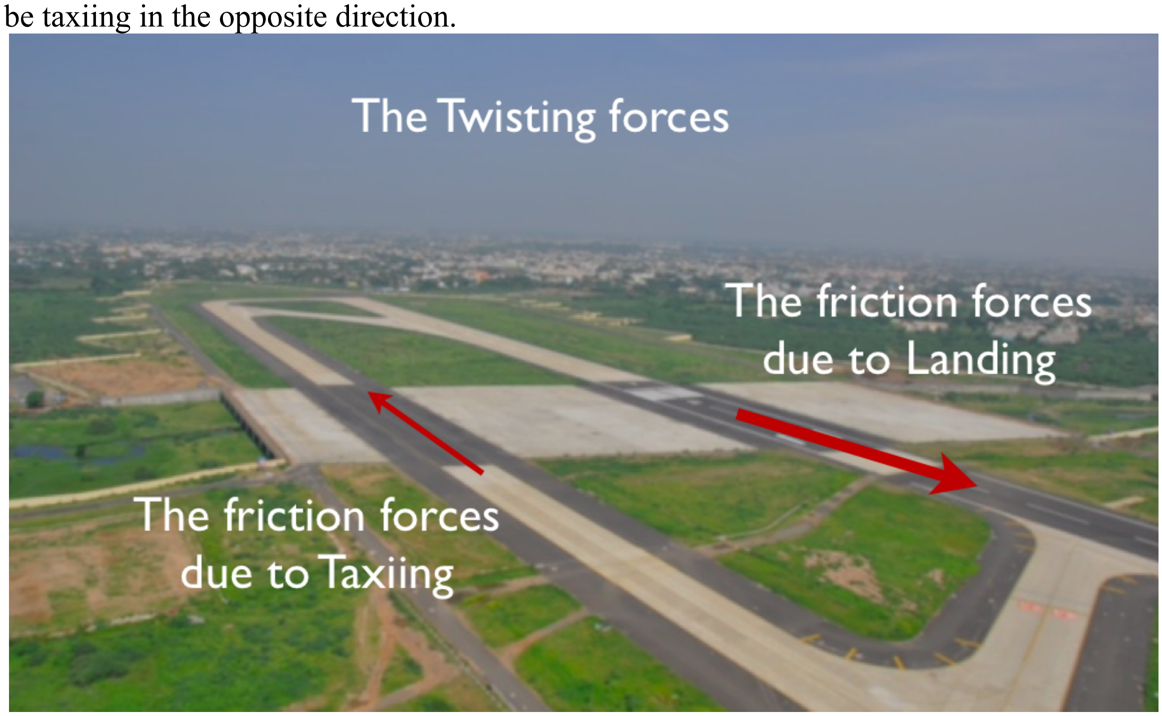
Hard Landing of a B 747 which could be upto a magnitude of 2g

A Hard landing on one wheel where the entire weight of the aircraft side slipping in a crosswind could place very heavy loads at a point on the runway.



During a crosswind landing, the touchdown will be at an angle to the direction of the runway. Due to friction forces, the wheel aligns itself with the direction of the runway. This will induce strong twisting force at the contact points of the wheels with the runway. When a wide body aircraft lands, there are two areas of contact where this force will occur. They may not be in the same line or plane for the twisting action

On the runway bridge constructed at Chennai, the twisting action is further compounded as the bridge is a continuous one containing both the runway and the taxi track. At a given time, you may have an aircraft landing on the runway bridge while another could be taxiing in the opposite direction.



Thus, you could have a situation where the forces acting on the bridge will have the following:

1. TWO twisting forces area on the runway at different points , in the direction of landing
2. Forces in the opposite direction due to a Taxiing aircraft
3. If the Max landing weight of an A 380 is taken as the basis (385,000Kgs for passenger aircraft and 427,000kgs for a Feighter), a 2g landing would result in a touchdown of either 770000kgs or 854000kgs impact.

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Was the bridge designed for taking such loads and twisting forces?
With the width of the runway being just 45m and not 60m, can AAI say that the runway is fit for A 380 operation? And, was L&T given the above details for arriving at the structural loads or were they just based on the max landing weight of A 380?

Were tests conducted to cover the above points?

I had sent you a letter regarding the ILS for Runway 12. The localiser for ILS Runway 12 cannot be located at the area that AAI has indicated, unless all the ICAO Annex 14, Volume 1& Annex 10 Standards, DGCA C.A.R and AAI CNS Manual standards are all violated. The high voltage current passing through the roof of Metro rail tunnel will interfere with Localiser signals and the heavy vibrations due to the passage of the trains in the tunnel as well as the heavy road traffic in the highway adjacent to the metrorail and end of Runway 12, will be completely against ICAO Standards.

The entire exercise appears to be ill-conceived, ill executed and will result in a major disaster if permitted for aircraft operations.

Regards
Capt.A.Ranganathan
Member, Operations Group-CASAC
cc.
1.PMO
2.Chief Minister's Cell, Tamil Nadu government
3. Shri Sitaram Yechury, MP- Chairman , Parliamentary Committee on Aviation
4. Shri Rudy Pratap Singh, MP