The Status & Future of Calicut International Airport

Technical Study Report

by

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The Status & Future of Calicut International Airport

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1. Introduction

Calicut International Airport (CCJ), also known as Karipur Airport, is an international airport serving primarily the districts of Kozhikode and Malappuram in Kerala, India. It is a Public sector government owned airport located in Karipur, about 25 Km from Malappuram and 28 Km from Kozhikode city. In 2014, traffic at Calicut International Airport exceeded 2.5 million passengers, and the total number of passengers in 2014-15 was 2,583,740. It was the twelfth busiest airport in India in terms of overall passenger traffic. The airport was inaugurated in April 1988, and it was given international airport status on February 2nd 2006. The airport serves as an operating base for Air India Express. Air Arabia, Air India, Emirates, Etihad Airways, Indigo, Jet Airways, Oman Air, Qatar Airways, Saudia, SpiceJet and FirstAir airlines also operated various international, national and cargo services from the airport. The Airport Council International's survey for Airport Service Quality (ASQ) for the quarter January 2012 to March 2012, rated Calicut International Airport as the best Airport Authority of India (AAI) airport in the country.

Figure 1: Calicut International Airport Runway

Calicut International Airport is considered as the gateway to the Malabar region of the state of Kerala. It gained its sanction after a long period of struggle, which began in 1977 under the leadership of freedom fighter late K.P. Keshava Menon. In the 1990s, Keralites residing in the Gulf countries played an important role in the development of the airport, by collecting the

required funds for the purpose, at a time when the Union Government conveyed its shortage of funds. Hence, Malabar International Airport Development Society was formed and it helped raise the required funds for airport's development. Consequently, major development such as extension of runway from 6000 feet to 9000 feet were carried out with loans from HUDCO, in order to facilitate operation of big-bodied aircrafts. Calicut Airport was the fifth airport in terms of income generation under AAI. The AAI, along with Air India, used to get remarkable earnings from this airport, as thousands of NRI's relied upon this airport to meet their traveling requirements.

The airport was partially closed from May 1st 2015, and the AAI has imposed restriction on wide body aircrafts such as but not limited to Boeing 777 and B747-400 and Airbus 330 series for a period of six months due to runway re-carpeting which is long overdue at Calicut Airport. As a result, Emirates, Saudi Arabian Airline and 2 Air India flight operations have been moved temporarily to the Private owned Cochin International Airport, and they have not been reinstated even after Fifteen months of suspending their operation at Calicut Airport. The continuing delay is causing huge losses for the Airport Authority of India, Government Exchequer and the Business Community due to the unprecedented drop in cargo business and passenger movement from the region. This is in addition to the financial and physical distress the passengers are experiencing as they are forced to rely on other airports to reach their choice of destination. This paper examines the status of the airport from technical, social and financial perspective, and examines it compliance with the national and international regulations that is required for the commercial airports.

2. Aerodrome Standards

As per the International Civil Aviation Organization (ICAO), Aerodrome is a defined area on land or water intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft. There are several data that is required for the proper planning of an aerodrome, and they are described briefly as below:

2.1. **Aerodrome Reference Code:** Aerodromes are provided with Reference Codes for aerodrome planning purposes in accordance with the characteristics of the aircrafts for which an aerodrome facility is intended. For example code: 4D, 4E etc (See Table 1-1. for details).

Table 2-1. Aerodrome reference code

CODE ELEMENT 1		CODE ELEMENT 2		
Code number	Aeroplane reference field length	Code letter	Wing span	Outer main gear wheel span[a]
(1)	(2)	(3)	(4)	(5)
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4.5 m
2	800 m up to but not including 1 200 m	B	15 m up to but not including 24 m	4.5 m up to but not including 6 m
3	1 200 m up to but not including 1 800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m
4	1 800 m and over	D	36 m up to but not including 52 m	9 m up to but not including 14 m
		E	52 m up to but not including 65 m	9 m up to but not including 14 m
		F	65 m up to but not including 80 m	14 m up to but not including 16 m

a. Distance between the outside edges of the main gear wheels.

By looking at the table, it can be seen that Code Number 1 to 4 is linked with the aerodromes reference field length, with code number 4 having reference field length of 1800 meter or more. Whereas Code Letter from A to F is linked to the wingspan and the outer main gear wheel spans with code letter E having the wingspan of 52 meter up but not including 65 meter; and outer main gear wheel span being 9 meters up but not including 14 meters.

2.2. **Physical Components:** The primary physical components of an aerodrome are the Runway, Taxiway / Taxi lane, and Aprons & Hangars. This paper's primary focus would be the Runway and parts associated with it in the aerodrome.

2.3. **Aerodrome Reference Point:** The aerodrome reference point which is usually planned at the geometric center of the aerodrome.

2.4. **Aerodrome Reference Temperature & Runway Elevation:** Another important factor that affects the aerodrome planning is the aerodrome reference temperature which is

determined in degree Celsius, and the runway elevation which is measured from the mean sea level. For the standard calculations elevation is considered as 15 meter above the mean sea level. The high altitude Aerodrome will require a longer runway length, aerodromes located less than 500 meters above mean sea level will not have any significant effect due to the elevation.

2.5. **Strength of Pavement:** The Aircraft Classification Number - Pavement Classification Number (ACN-PCN) method is used for reporting pavement strengths. The Aircraft Classification Number (ACN) is a number that expresses the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength; whereas Pavement Classification Number (PCN) is a number that expresses the load-carrying capacity of a pavement for unrestricted operations. The ACN-PCN system is structured so a pavement with a particular PCN value can support an aircraft that has an ACN value equal to or less than the pavement's PCN value. This is possible because ACN and PCN values are computed using the same technical basis.

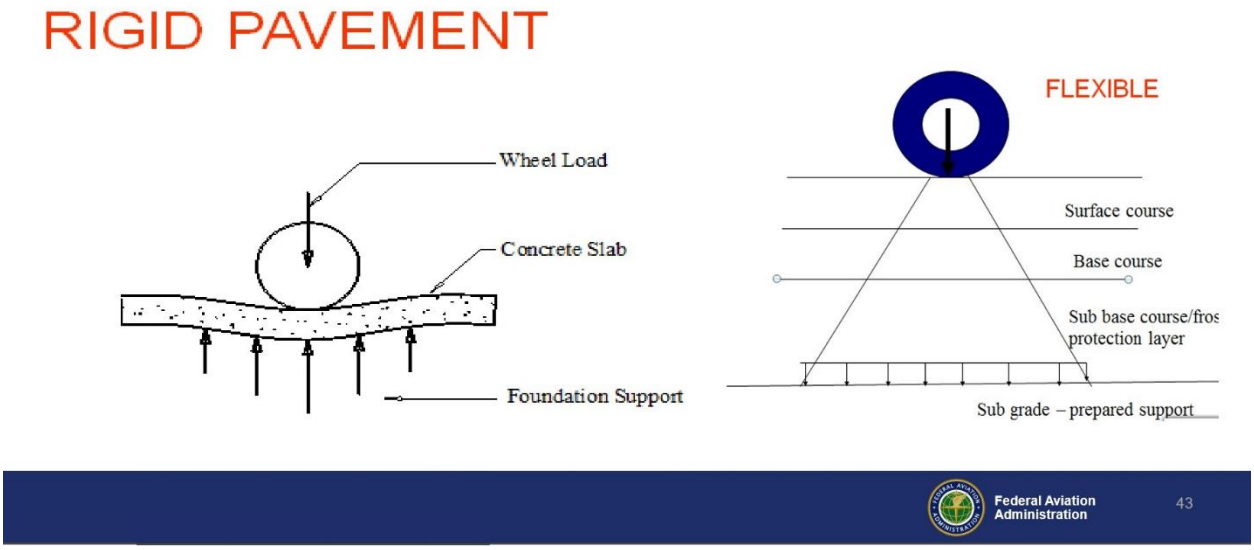

Figure 2-1.

2.5.1. There are two types of pavement, the rigid pavement like concrete and flexible pavement like asphalt (See Figure 1-1).

2.5.2. Strength of Pavement is an important factor for an aerodrome, the bearing strength of a pavement intended for aircraft apron mass greater than 5700 kg is determined using ACN - PCN method by reporting the following information: the pavement classification number (PCN); Pavement type for ACN-PCN determination: Rigid Pavement Code : R, Flexible Pavement Code : F. Subgrade strength category: High-strength : A , Medium strength: B, Low strength: C, Ultra low strength: D; and Maximum allowable tire pressure category is determined by: High: W, Medium: X ,

Low: Y , and Very low: Z.; and the Evaluation method: Technical evaluation: T, and Using aircraft experience: U.

2.5.3. Pavement strength data are reported under the ACN-PCN method as follows: PCN 50 / F/ A/Y/U.

Figure 2-2. Transport aircraft with tricycle landing gear

2.5.4. Maximum payload of the aircraft and number of gears are related to each other, as the aircraft get heavier, number of gears needs to be increased, so that the payload get distributed and causes less damage to runway surface. A landing gear configuration with multiple gears of more than four wheels also improves take-off and landing safety.

Figure 2-3. Transport aircraft Boeing 747 with multi-bogey landing gear

2.6. Runway Design

Runway is a defined rectangular area on land aerodrome prepared for the landing and take-off of aircraft. The primary Physical Characteristics of Runway are Length of Runway, Width of runway, the Shoulders, Runway strips and Runway end safety areas.

2.6.1. **Physical Features of Runway**

a. Runway's number and orientation of runways: It depends on the choice of maximum permissible crosswind components, it shall be assumed that Landing or Takeoff of airplanes is, in normal circumstances, precluded when the crosswind component exceeds 37 km/h in case of aircrafts whose reference field length is 1500 meters or over.
b. Location of threshold: A threshold shall normally be located at the extremity of a runway unless operational considerations justify otherwise.
c. **Actual length of a runway:** Actual runway length to be provided shall be adequate to meet the operational requirements of the aircrafts for which the runway is intended and shall not be less than the longest length determined by applying the corrections for local conditions to the operations and performance characteristics of the relevant aircrafts. Both take-off and landing requirements need to be considered when determining the length of runway to be provided. Local conditions that may need to be considered include elevation, temperature, runway slope, humidity, and the runway surface characteristics. The Aircraft Classification and required Reference Field Length for each aircraft model are provided in the ICAO Aerodrome Design Manual.

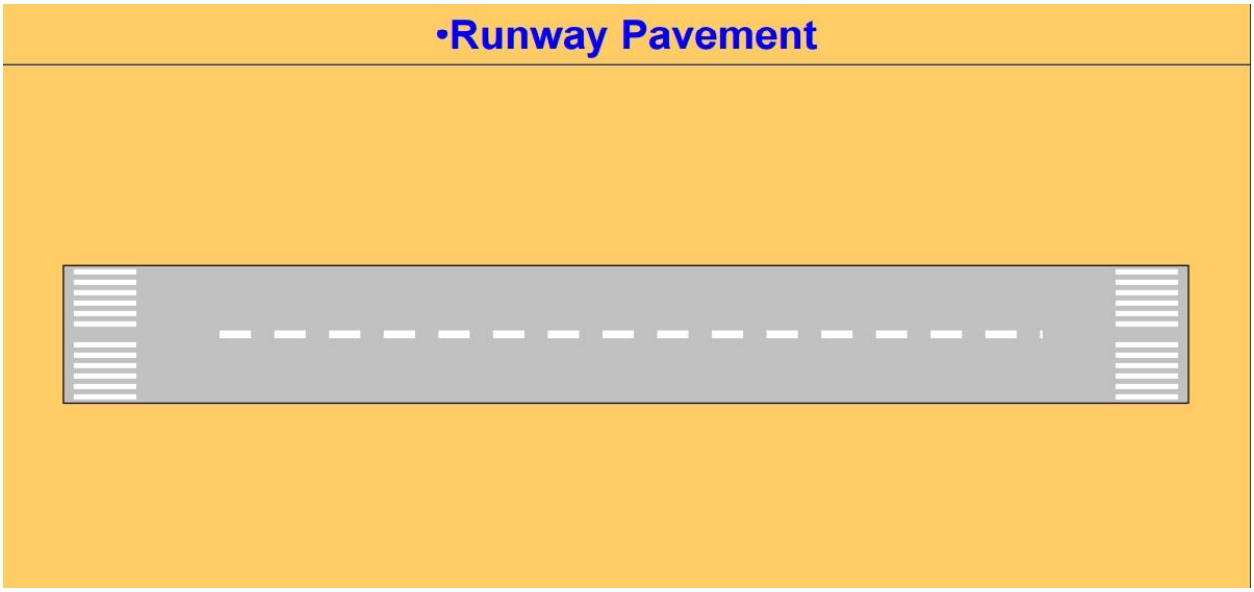

Figure 2-4.

d. **Width of runways**: Width of a runway shall not be less than the appropriate dimension specified in Table 2-3; the widths shown in the table are the minimum widths considered necessary to ensure safety of operations. The factors affecting the width of the runways are deviation of an aircraft from the center line at touchdown; cross-wind condition; runway surface contamination (eg: rain, snow or ice); rubber deposites; crab landing approaches used in cross-wind conditions; approach speeds used; visibility; and Human factors.

Table 2-3.

Code Number	Code Letter					
	A	B	C	D	E	F
1[a]	18 m	18 m	23 m	—	—	—
2[a]	23 m	23 m	30 m	—	—	—
3	30 m	30 m	30 m	45 m	—	—
4	—	—	45 m	45 m	45 m	60 m

a. The width of a precision approach runway should be not less than 30 m where the code number is 1 or 2.

e. Slopes on runway: The longitudinal slops computed by dividing the difference between the maximum and minimum elevation along the runway centerline by the runway length shall not exceed 1% were the code number is 3 or 4, and along no portion of a runway shall the longitudinal slope exceed 1.25% where the code number is 4. The transverse slop shall ideally be 1.5% where the code letter is C,D,E or F, but in any event shall not exceed 1.5% nor be less than 1% except at runway or taxiway intersections where flatter slopes may be necessary.

f. Strength of runways: A runway shall be capable of withstanding the traffic of aircrafts the runway is intended to serve.

g. Surface of Runway: It shall be constructed without irregularities that would result in loss of friction characteristics.

2.6.2. **Runway shoulders**

Runway shoulders shall be provided for a runway where the code letter is D or E and the runway width is less than 60 meter, shoulders shall also be provided for a runway where the code letter is F. The width of runway shoulder shall extend symmetrically on each side of the runway so that the overall width of the runway and its shoulders is not less than 60 meter where the code letter D or E, and not less than 75 meter where code letter is F.

2.6.3. **Runway strips**

A runway and any associated stopways shall be included in a strip:

a. **Length of a runway strip:** Length of a runway strip shall extend before the threshold and beyond the end of the runway or stopway for a distance of at least 60 meter for the code number is 2, 3 or 4.

b. Width of runway strips:

- Width of a runway strip including a **precision approach runway shall, wherever practicable, extent laterally to a distance of at least 150 meters** where the code

number is 3 or 4 on each side of the center line of the runway and its extended centerline throughout the length of the strip.

- Width of a runway strip including **a non-precision approach runway shall extend laterally to a distance of at least 150 meters** where the code number is 3 or 4 on each side of the center line of the runway and its extended centerline throughout the length of the strip.
- Width of runway strip including a **non-instrument runway** shall extend on each side of the center line of the runway and its extended centerline throughout the length of the strip, to a distance of at least 75 meter where the code number is 3 or 4

A brief description about Instrument runway have been provided below, to have a clear understanding of a particular airport site requirements and how site specific issues can be addressed by utilizing the technologically advanced equipment.

Instrument runway. One of the following types of runways intended for the operation of aircraft using instrument approach procedures:

a) Non-precision approach runway. An instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight-in approach.

b) Precision approach runway, category I. An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height not lower than 60 m (200 ft) and either a visibility not less than 800 m or a runway visual range not less than 550 m.

c) Precision approach runway, category II. An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not lower than 350 m.

d) Precision approach runway, category III. An instrument runway served by ILS and/or MLS to and along the surface of the runway and:

A — intended for operations with a decision height lower than 30 m (100 ft), or no decision height and a runway visual range not less than 200 m.

B — intended for operations with a decision height lower than 15 m (50 ft), or no decision height and a runway visual range less than 200 m but not less than 50 m.

C — intended for operations with no decision height and no visual range limitations.

c. Objects on runway strips: No fixed objects other than visual aids required for air navigation purposes and satisfying the relevant frangibility requirement shall be permitted on a runway strip within 60 meter of the runway center line of a precision approach runway category I, II or III where the code number is 3 or 4. No mobile object shall be permitted on this part of the runway strip during the use of runway for landing and take-off.

d. Grading of runway strips: That portion of a strip of an instrument / non-instrument runway within a distance of at least 75 meter where the code number is 3 or 4 from the center line of the runway and its extended centerline shall provide a graded area for the

airoplanes which the runway is intended to serve in the event of an airoplane running off the runway.

e. Slopes on runway strips: Longitudinal slope along that portion of a strip to be graded shall not exceed 1.5% where the code number is 4; and 1.75 where the code number is 3. Transverse slopes on that portion of a strip to be graded shall be adequate to prevent the accumulation of water on the surface but shall not exceed 2.5% where the code number is 3 or 4.

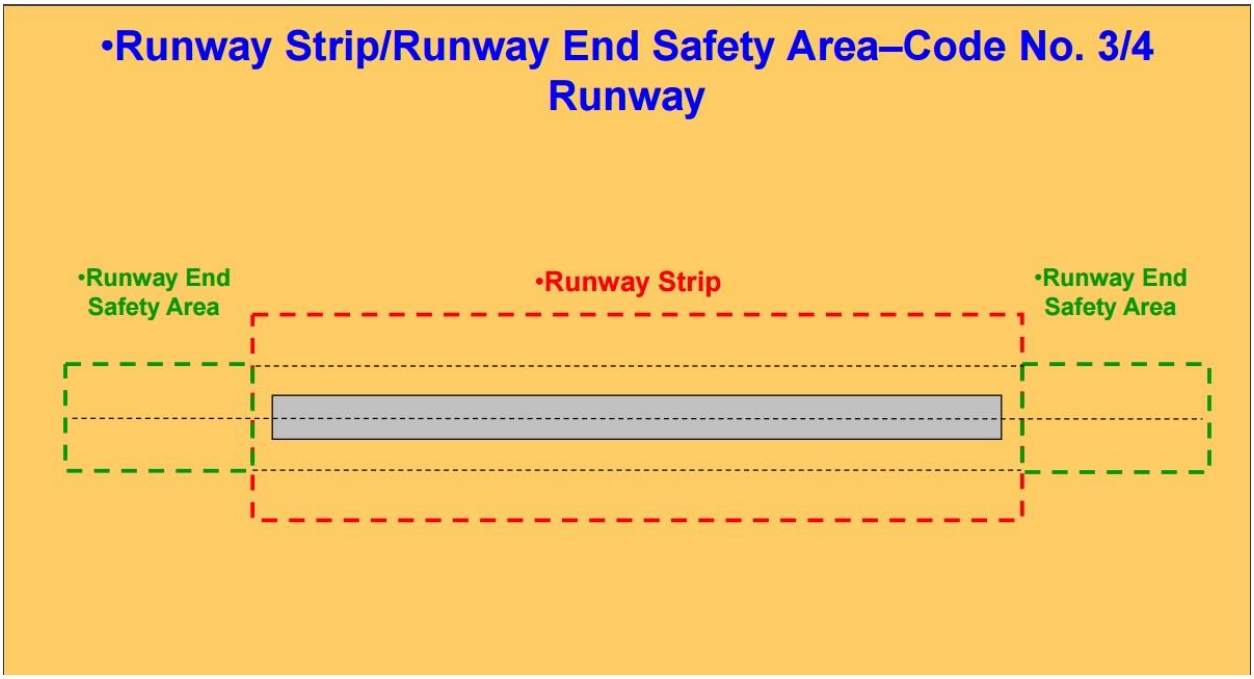

Figure 2-5.

2.6.4. **Runway end safety area (RESA)**

It's an area symmetrical about the extended runway centerline and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aircraft undershooting or overrunning the runway (See Figure 2-5.). A runway end safety area shall be provided at each end of a runway strip where the code number is 3 or 4. Dimensions of RESA are given as below:

a. A runway end safety area shall extend from the end of a runway strip to a **distance of at least 90 meter.**

b. A runway end safety area shall, **as far as a practicable**, extend from the end of a runway strip to a **distance of at least 240 meter where the code number is 3 or 4.**

c. The width of a runway end safety area shall be at least twice that of the associated runway, and wherever practicable, the width shall be equal to that of the graded portion of the associated runway strip.

The Figure 2-6 shows the overall runway components of an aerodrome particularly the runway strip and runway end safety area for both code number 3 and 4 runway as per the ICAO aerodrome design manual.

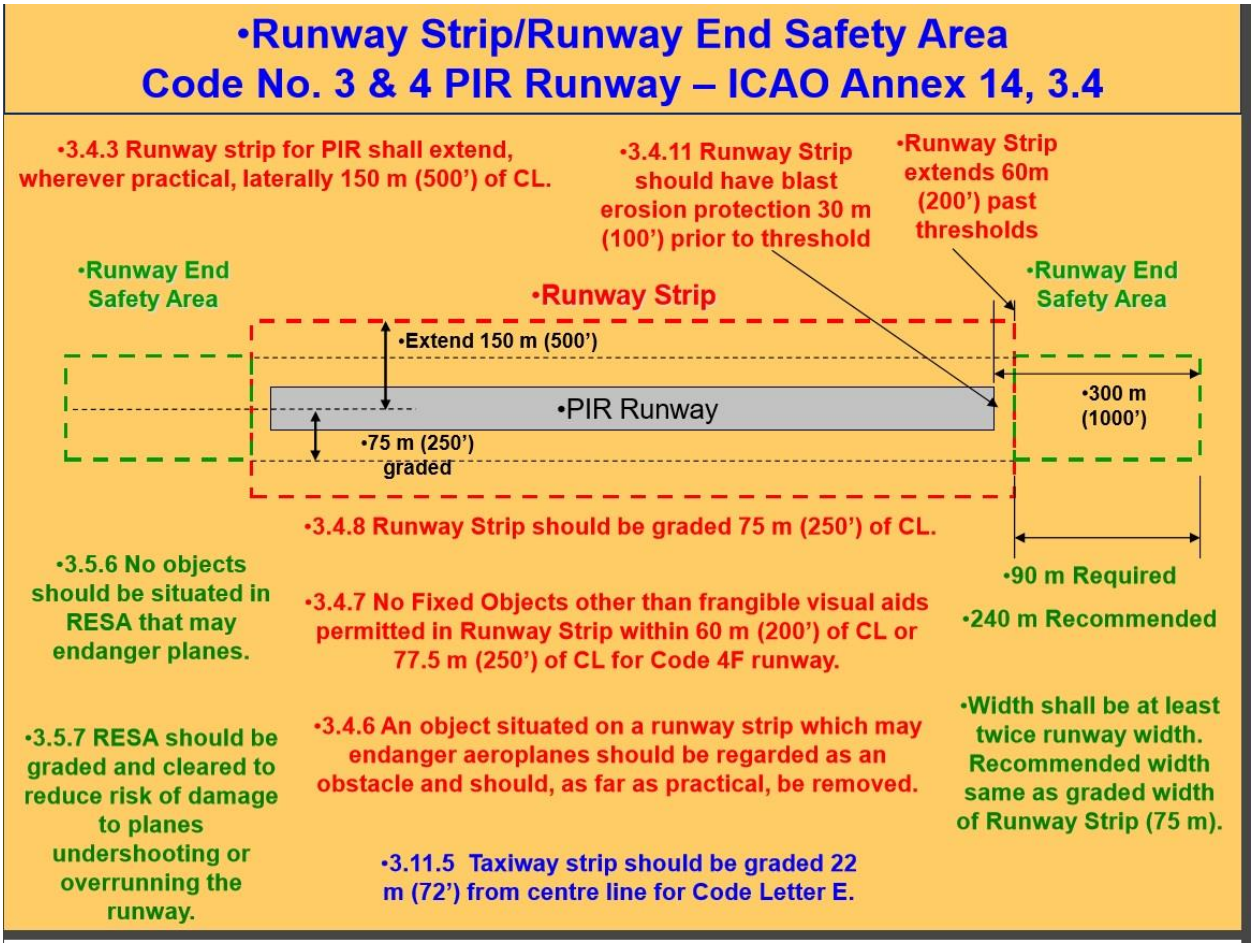

Figure 2-6.

2.6.5. Clearways (CWY)

Clearways are defined as a rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an airoplane may make a portion of its initial climb to a specified height. The origin of a clearway shall be at the end of take-off run available (TORA). The length of a clearway shall not exceed half the length of the takeoff run available, and the width of clearway shall extend laterally to a distance of at least 75 meters on each side of the extended centerline of the runway.

2.6.6. Stopways (SWY)

Stopway is a defined rectangular area on the ground at the end of takeoff run available prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take off. A stopway shall have the same width as the runway with which it is associated.

The inclusion of specifications for Clearways and Stopways in this section is not intended to imply that a clearway or stopway has to be provided.

2.7. Declared distances

The following distances shall be calculated to the nearest meter intended for use by International Commercial Air transport:

2.7.1. Takeoff run available (TORA)
2.7.2. Takeoff distance available (TODA)
2.7.3. Accelerate stop distance available (ASDA)
2.7.4. Landing distance available (LDA)

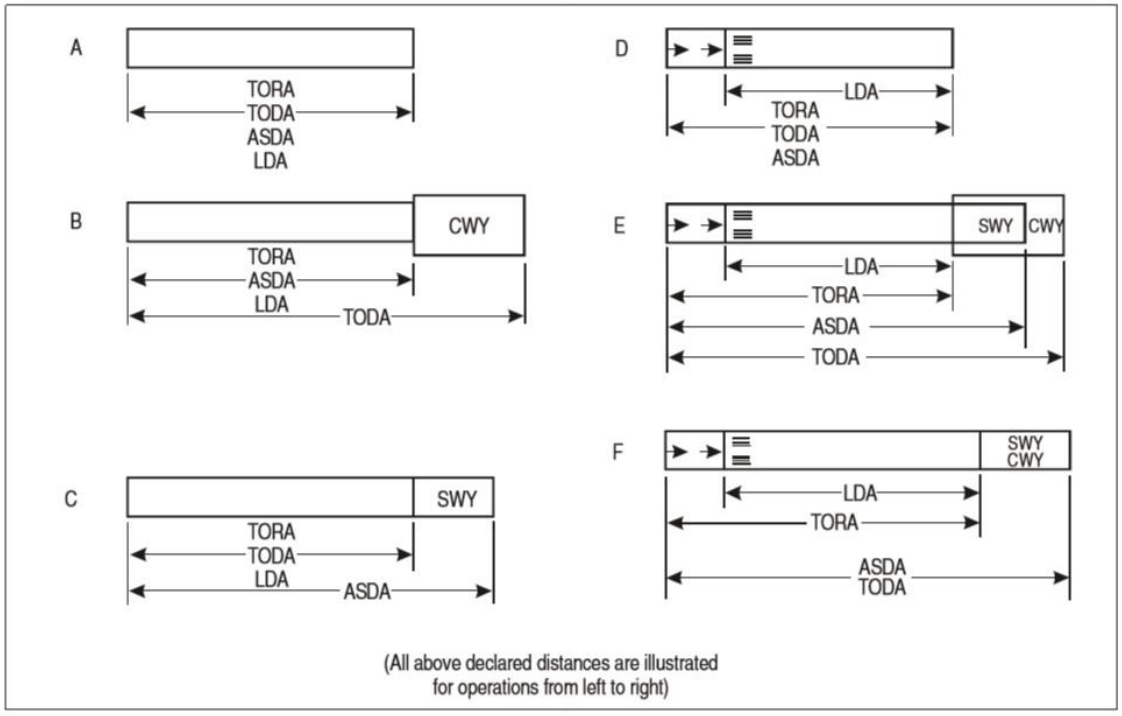

Figure 2-7. Illustration of declared distances

These distances varies depending on the physical characteristics of particular runway, and the Figure 2-7 shows the illustration of various combination of these distances.

3. Aerodrome at Calicut International Airport

Calicut International Airport is listed as a 'Public Use' category airport in the 'List of Licensed Aerodromes' by the Directorate General of Civil Aviation (DGCA), Ministry of Civil Aviation, India. It is a Public airport owned by the Government and operated and managed by the Airport Authority of India (AAI), and Aerodrome License Number AL/Public/019 has been issued to Calicut Airport. The airport operates everyday on 24 hours basis as notified by relevant NOTAMS for takeoff and landing of aircraft within the preview of the rule 78 of Indian Aircraft Rules, 1937 for public use only.

The Calicut International Airport consists of a single runway designated as runway RWY 10 / RWY 28. Figure 3-2 below shows the grid map of the Calicut Airport and the aerodrome details as it was published by Airport Authority of India in 2012.

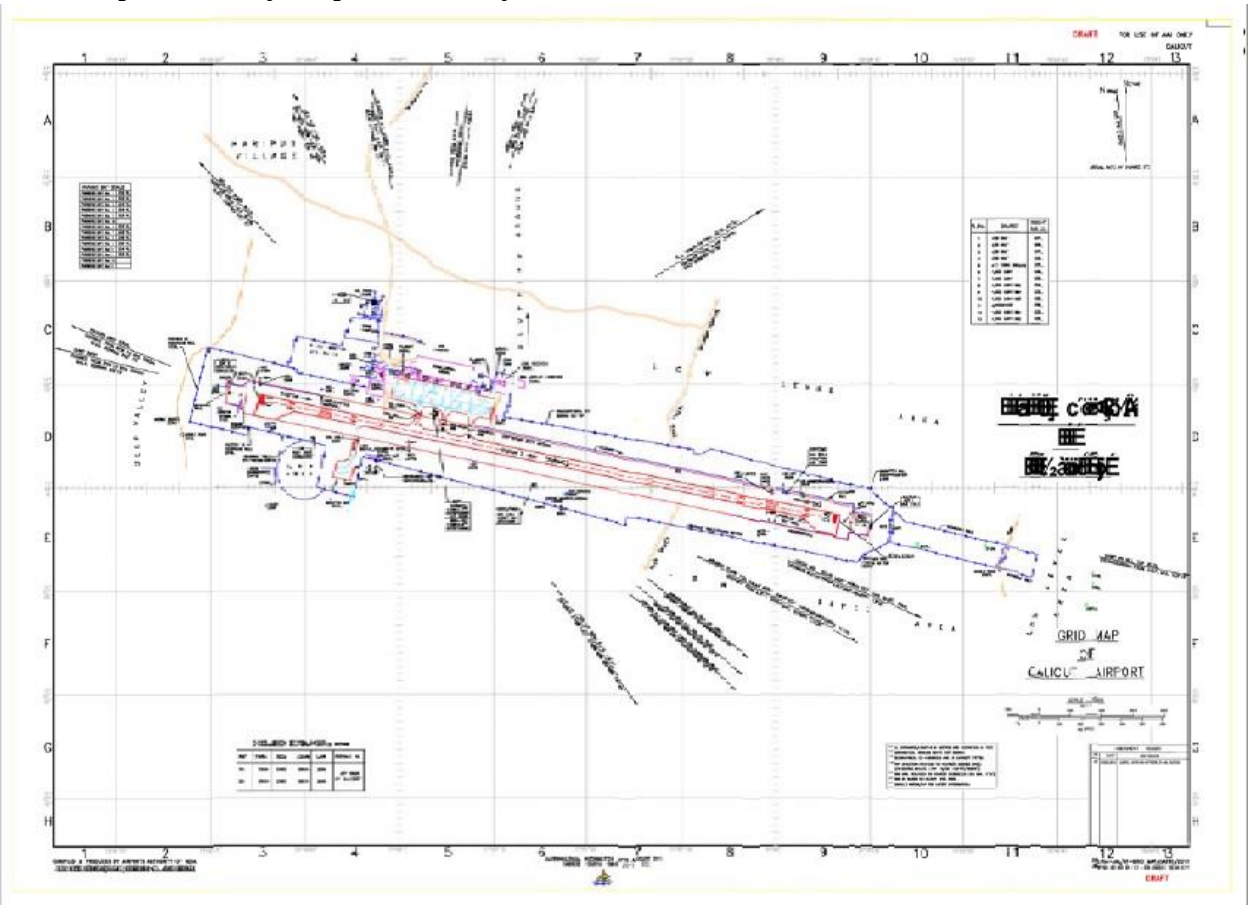

Figure 2-2. Grid Map of Calicut Airport

The airport's aerodrome reference code is 4D, with code E class operation allowed for Boeing B777 and B747, and Airbus A330; as these aircrafts require category 4E aerodrome, but operates on a category 4D aerodrome with some pay load restrictions. Type of intended aircrafts and their required reference field lengths as per ICAO aerodrome design manual for aerodromes having reference code 4C, D, E & F are shown in Table 3-1.

Table 3-1. Aircraft Classification by Code Number and Letter

Aircraft Make	Model	Code	Aircraft reference field length (m)	Wing span (m)	Outer main gear wheel span (m)
Airbus	A320-200	4C	2480	33.9	8.7
Boeing	B727-100	4C	2502	32.9	6.9
	B727-200	4C	3176	32.9	6.9
	B737-400	4C	2550	28.9	6.4
McDonnell Douglas	MD88	4C	2470	32.9	6.2
Airbus	A300 B4	4D	2605	44.8	10.9
Boeing	B707-300	4D	3088	44.4	7.9
	B757-300	4D	2400	38.1	8.6
	B767-200	4D	1981	47.6	10.8
	B767-300ER	4D	2540	47.6	10.9
	B767-400ER	4D	3130	51.9	10.8
Tupolev	TU134A	4D	2400	29	10.3
Boeing	B747-100	4E	3060	59.6	12.4
	B747-400	4E	2890	64.9	12.6
	B777-200	4E	2390	61	12.9
	B777-300ER	4E	3120	64.8	12.9
	B777-300	4E	3140	61	12.9
McDonnell Douglas	MD11	4E	3130	52	12.6
Airbus	A380	4F	3350	79.8	14.3
Airbus	A330-200 *	4E	2070	60.3	10.69
	A330-200F *	4E	2070	60.3	10.69
	A330-300 *	4E	2070	60.3	10.69
	A340-300 *	4E	2489	60.3	10.69
	A340-500 *	4E	2881	63.45	10.69
	A340-600 *	4E	2826	63.45	10.69

* Air Cyber Alliance - Aircraft Runway Requirements: http://aircyber.weebly.com/aircraft-runway-requirements.html

3.1. Aerodrome Details

3.1.1. Calicut International Airport (IATA: CCJ, ICAO: VOCL) general information as of 2012 are given below:

a. Aerodrome reference code: 4D (Code E operation is allowed with load restriction)
b. Location of the aerodrome: 127 deg, 28 km from Kozhikode Railway station
c. ARP Geographical coordinates (WGS084): 11 08’ 16’ N 075 57’ 02’ E
d. ARP Elevation : 332 Ft / 101.22 m
   Magnetic variation / Annual rate of change: 2.33 W(1995) / 0.03 E
e. Elevation of Threshold : RWY 10 – 314 Ft / 95.71 M
   RWY 28 - 325 Ft / 99 M

f. Aerodrome reference temperature: 31 C
g. Aerodrome Beacon: Flashing White and Green 15 rpm
h. List of exemptions:
   i. Width of Runway basic strips available is 75 m from centerline of runway instead of 150 m due to geological limitations.
   ii. Fixed objects such as GP Hut, VOR Structure, MET Installations are within the basic strip (150 m).

Figure 3-1. Aerodrome Map

3.1.2. Aerodrome's physical dimensions and related information are described below:
   a. Runway Physical Characteristics, See Table 3-2.

Table 3-2.

Designations RWY NR	TRUE & MAG BRG	Dimensions of RWY (M)	Strength (PCN) and surface of RWY and SWY	THR coordinates	THR elevation and highest elevation of TDZ of precision APP RWY (FT)
1	2	3	4	5	6
10	100.93° GEO	2850 x 45	56/F/A/X/T	110818.38N	THR:314FT
	102.75° MAG		Asphalt Concrete	0755633.82E	TDZ:338FT
28	280.93° GEO 282.75° MAG	2850 x 45	56/F/A/X/T Asphalt Concrete	110800.78N 0755806.38E	THR:325FT TDZ:327FT
Slope of RWY-SWY	**SWY dimensions (M)**	**CWY dimensions (M)**	**Strip dimensions (M)**	**OFZ**	**Remarks**
7	8	9	10	11	12
RWY 28 -0.29%	---	---	2970 x 150	Nil	Nil
RWY 10 +0.29%	---	---	2970 x 150	Nil	Nil

Note: It should be noted that the PCN value given above is as per FY 2012 report, and it should have changed to a higher value after the completion of re-carpeting work that took place in 2015-16.

b. Runway strip dimension: 2980 M x 150 M
SWY/ OFZ : Nil
RESA : RWY 10 ----RESA 93 x 90 M ; RWY 28 ---- RESA 92x90 M
Even though the width of graded portion of runway strip is 150 meters, the total width of uneven land throughout the length of the runway ranges from about 300 m to 360 meters.

c. Taxiway, see Table 3-3.

Table 3-3.

TAXIWAY	LENGTH	WIDTH	SURFACE	PCN
A	117M	23M	ASPHALT CONCRETE	55/F/A/X/T
B	117M	23M	CEMENT	55/R/A/X/T
C	117M	23M	CEMENT	55/R/A/X/T
D	175M	23M	CEMENT	55/R/A/X/T

d. Apron & Parking Stand: There is only one apron at Calicut Airport. All flights (International / Domestic) are parked in this apron. There are four Taxiways, Taxiway A,B and C connects the Apron to the Runway, and Taxiway D connects Isolation Bay to the Runway. Apron details are as below:

DIMENSION	480X100 sq. mt.
PCN	55/R/A/X/T
SURFACE	CEMENT CONCRETE
TOTAL NO. OF PARKING STANDS	11
TYPE OF AIRCRAFT MAXIMUM THAT CAN BE ACCOMMODATED	BOEING – 747
APRON FLOOD LIGHTS	AVAILABLE

e. Clearway : Nil.

f. Visual Aids, see Table 3-4 below:

Table 3-4.

Designations RWY	APCH LGT TYPE LEN INTST	THR LGT / COLOUR WBAR	VASIS / (MEHT) PAPI	TDZ, LGT LEN	RWY centre line LGT / Length, spacing, colour and intensity	RWY edge LGT / Length, spacing, colour and intensity	RWY end LGT colour / WBAR	SWY LGT LEN (M) / colors	Remarks
1	2	3	4	5	6	7	8	9	10
10	Abridged SALS 150M LIH	Green	PAPI, LEFT 3º,19.83M (65.06 FT)	Nil	Nil	2850M, 60M, WHITE,LIH	Red	Nil	RWY Guard light on Taxiways A,B,C
28	Abridged SALS 150M LIH	Green	PAPI, LEFT 3.2º 21.48M (70.47FT)	Nil	Nil	2850M, 60M, WHITE,LIH	Red	Nil	

Marking

MARKINGS	RWY DESIGNATION, THR, AIMING POINT, TOUCH DOWN ZONE, CENTERLINE, TRANSVERSE STRIPE AND SIDE STRIPE, TAXIWAY MARKING APRON MARKING

Secondary power supply / switchover time: Secondary power supply to essential lighting and operational units at AD. Switch over time: 8 seconds. APP/RWY (Primary circuit), PAPI, & all NAV/COM AIDS: on UPS

Lead-in lights: Four lead-in lights, each consisting of a group of 3 sequential flashing white lights in a linear configuration installed in the Final approach track at a dist of 6193 M, 4721 M, 3121 M & 1826 M respectively from threshold Rwy 28. Intensity – 300 cd / 1500 cd / 15000 cd.

g) VOR check point - Taxiway holding point (304^0 /0.4 nm from CLC VOR)
[See additional information data in (r)]

h) Standard taxi route - AVAILABLE

I) geographical coordinate of threshold- mentioned in table (a)

J) Geographical coordinate of taxiway center line point- not available

k) Geographical coordinate of aircraft stand - available (see annexure)

l) Top elevation of significant obstacle – [See Aerodrome Obstacle data in (t)]

m) Pavement surface type and bearing strength –mentioned in table a. c & d above

n) Altimeter Checkpoint : Apron 333.5 FT/101.5 M

o) Declared Distances, see Table 3-5:

Table 3-5.

RWY designator	TORA (M)	TODA (M)	ASDA (M)	LDA (M)	Remarks
1	2	3	4	5	6
10	2850	2850	2850	2850	RESA 93 X 90 M
28	2850	2850	2850	2850	RESA 92 X 90 M

p) Disabled aircraft removal plan- : Available at airport

q) RESCUE AND FIRE FIGHTING SERVICES

1	AD category for fire fighting	CAT 9
2	Rescue equipment	Available as per category
3	Capability for removal of disabled aircraft	Lifting and pulley machine up to 5 Tones at AD. Higher capacity available in the city.
4	Remarks	Nil

r) Landing Aids

Runway	Landing Aid
	ILS CAT
10	Available/ CAT-I/3.0 Deg
28	Available/ CAT-I/3.0 Deg

3.2. Current Status

As of November, 2016, Calicut International Airport is served by about 9 passenger and cargo airlines which fly to 13 destinations in India, UAE, Oman, Qatar, Bahrain, Kuwait and Saudi Arabia. Air India was operating nonstop service to Jeddah King Abdulaziz International Airport with a Boeing 747-400 flight, and was operating Boeing 777-300 ER flight to Riyadh King Khalid International Airport; both services have been suspended since 1st May, 2015 due to the

Airport Authority of India's (AAI) restriction for wide body aircrafts for a period of six months due to runway re-carpeting.

Similarly, operations of Saudi Arabian Airlines that was operating B747 and B777 to Riyadh and Jeddah, and Emirates that was operating 11 wide-body aircraft per week to Dubai International Airport with Airbus 330 and Boeing 777, providing 278/346 seats per flight also have been temporarily suspended and moved to Cochin International Airport during this period. Other airlines that operates to international and national destinations from Calicut International Airport such as Air India Express, Air Arabia, Air India, Etihad Airways, Indigo, Jet Airways, Oman Air, Qatar Airways and SpiceJet **operates aircrafts that require only category 4C aerodrome**, such as Boeing 737, Airbus A319, A320 and A321 etc.

This has adversely affected the functioning of the airport, and has caused trouble to fliers and disrupted the cargo movement. The Airport Authority of India should have taken up the re-carpeting and strengthening of runway much earlier, instead of partially closing the airport in an abrupt manner at the beginning of the peak season on May 1st 2015, even though the actual work on the airport aerodrome started only in November 2015. This shows serious lack of proper planning and scheduling on the part of airport management and the authorities to alleviate the difficulties faced by the fliers, commuters and businesses during this prolonged work period, which is never heard of in any part of the world.

The AIP Supplement 81/2015 issued for information, guidance and necessary action by officiating chairman of Airport Authority of India on October 1st 2015, clearly mentions the purpose and period of closure of runway at Calicut International Airport effective from November 12, 2015. As per the issued AIP Supplement, the strengthening and re-carpeting work is planned in two phases to ensure that the Runway is made available for operations to the maximum possible time with revised declared distances. Phase I was scheduled from November 12, 2015 to April 30, 2016 during which the RWY 10/28 was not available for operations due to work in progress from 06:30 UTC to 14:30 UTC; and outside this closure period, portion of RWY from beginning of RWY 28 up to 400 m including turning pad was not available for operations, and the RWY 28 threshold was shifted by 400 m. Revised applicable declared distances during Phase I are as given in Table 3-6 below.

Table 3-6.

Phase I					
From	**To**	**Timings (UTC)**	**Period**	**Area of work**	**Remarks**
12 NOV 2015	30 APR 2016	0630 to 1430	5 Months & 18 days	Full length of Runway	400M from beginning of RWY 28 including turn pad not available.
Declared Distances					
RWY	**TORA**	**TODA**	**ASDA**	**LDA**	**RESA**
10	2450M	2450M	2450M	2450M	90X90M
28	2450M	2450M	2450M	2450M	92X90M

And, Phase II of the strengthening and re-carpeting work was scheduled from May 1st 2016 to February 28, 2017 during which the RWY 10/28 will not be available for operations due to work in progress from 06:30 UTC to 14:30 UTC; and outside this closure period, all navigational aids, ground aids, taxiways and full length of runway 10/28 including turn pad shall be available for operations. And the revised declared distances are given in Table 3-7 below:

Table 3-7.

Phase II					
From	**To**	**Timings (UTC)**	**Period**	**Area of work**	**Remarks**
01 MAY 2016	28 FEB 2017	0630 to 1430	10 Months	Full length of Runway	Resurfacing and strengthening of entire length of runway and relocating of AGL.
Declared Distances					
RWY	**TORA**	**TODA**	**ASDA**	**LDA**	**RESA**
10	2850M	2850M	2850M	2850M	93X90M
28	2850M	2850M	2850M	2850M	92X90M

It worth to note that the declared distances during Phase II of the strengthening and re-carpeting work mentioned in Table 2-2 above for Calicut International Airport are the SAME declared distances that was available before the partial closure of the airport, as mentioned in Section 2.A.o. of this report. Moreover, as per the unofficial information that was received, after completion of Phase I of the work, **the pavement classification number (PCN) of the runway have become 75 instead of 56** improving the runway's pavement strength to the level of major international airports across the globe.

Runway of Calicut International Airport

Figure 3.2.

4. Comparison with other International & National Airports

There are several airports having similar features to that of Calicut International Airport operating effectively on international as well national level. For the comparison purpose, the San Diego International Airport (SAN) and the Luknow International Airport (LKO) as an international and national level airport respectively have been selected, as both of them have runway length that is similar to or less than that of Calicut Airport, and wide body aircrafts that require category 4D or 4E aerodromes are efficiently operating from these airports.

4.1. San Diego International Airport

San Diego International Airport (IATA: SAN, ICAO: KSAN) is an international airport 4.8 km northwest of downtown San Diego, California, United States. It is operated by the San Diego County Regional Airport Authority. In 2015, traffic at San Diego International Airport exceeded 20 million passengers. The airport had about 465 scheduled operations carrying 48,000 passengers each day, a total of 18,756,997 passengers in 2014. The airport has domestic flights and also has international flights to Canada, the United Kingdom, Mexico, and Japan. San Diego is a focus city for Alaska Airlines and Southwest Airlines. The top five carriers in San Diego during 2015, by seat capacity, are Southwest Airlines (42.7%), American Airlines (14.0%), United Airlines (11.2%), Alaska Airlines (10.1%), and Delta Air Lines (9.9%). It is the busiest single-runway commercial airport in the United States. San Diego International Airport has two terminals: Terminal 1 has two parts: East and West, and has 19 gates, numbered 1A and 1–18. Terminal 2 has two parts: East and West, and has 32 gates, numbered 20–51. All international arrivals at San Diego International Airport are handled in Terminal 2 East at gates 20, 21 and 22.

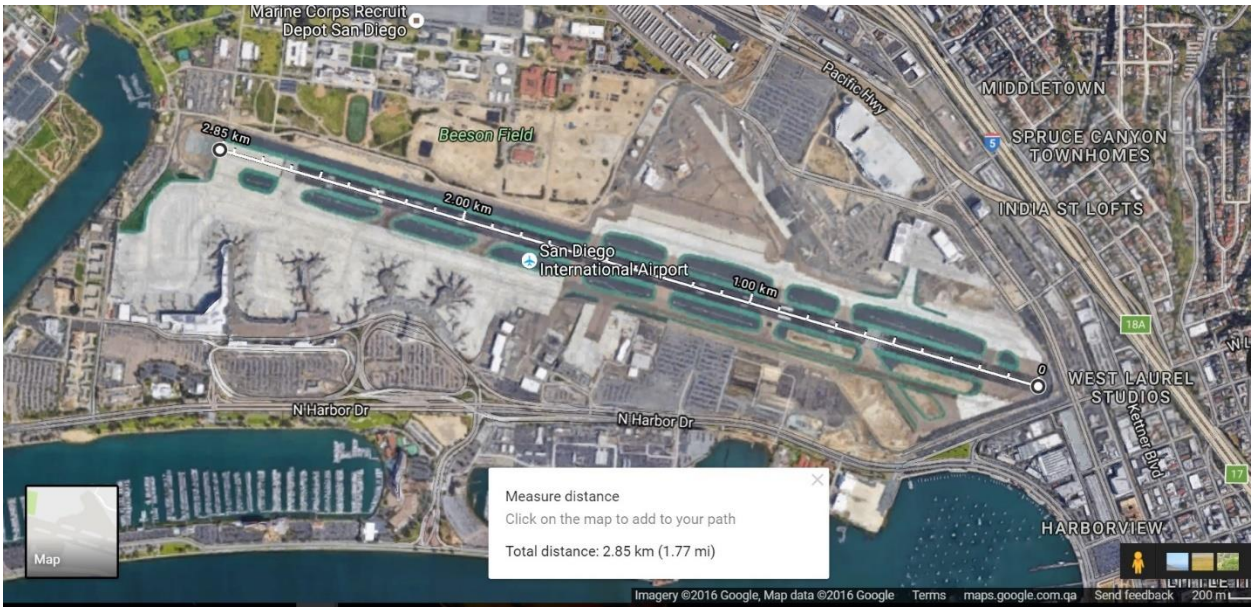

Figure 4-1.

4.1.1. **Runway configuration and landing**

The airport consists of a single runway designated as runway 9/27. The runway is an asphalt and concrete design with dimensions of 9,400 feet (2,865 m) x 200 feet (61 m). A displaced threshold exists in both directions. For runway 27 the first 550 m are displaced and for runway 9 the first 210 m are displaced. Figure 4-1 shows the runway map of the airport. Typical prevailing winds in San Diego are from the west and most takeoffs and landings at the airport are from east to west utilizing runway 27. The estimated Elevation of the runway is 16.8 ft. / 5 m. The approach from the east is steeper than most because the terrain drops from 266 ft (81 m) to sea level in less than one nautical mile. The runway is west of a hill with several obstructions, including Interstate 5 and trees in Balboa Park. Terrain east and west of the airport greatly impacts the available runway length. Runway 27 (heading west) has a climb gradient of 353 ft/nmi (58.1 m/km) feet per nautical mile. Taking off to the east requires a 610 ft/nmi (100 m/km) climb rate. Table 4-1 below shows the declared distances and classes for the San Diego airport.

Table 4-1.

RWY designator	TORA	TODA	ASDA	LDA	Pavement Class
1	2	3	4	5	6
'09	8280 ft (2524m)	9401 ft (2865m)	8280 ft (2524m)	7820 ft (2384m)	75 /F/A/W/T
'27	9401 ft (2865m)	9401 ft (2865m)	9401ft (2865m)	7591 ft (2314 m)	75 /F/A/W/T

San Diego International Airport **does not have standard 300 m runway safety areas at the end (RESA)** of each runway. An **engineered materials arrestor system (EMAS)** has been installed at the west end of the runway to halt any aircraft overruns. Because of the airport's close proximity to downtown San Diego, Federal Aviation Administration (FAA) regulations do not allow any building within a 1.5 mile (2.4 km) radius of the runway to be taller than 500 feet (152 m).

4.1.2. **Current status**

As of September, 2016, San Diego International Airport is served by 17 passenger airlines and five cargo airlines which fly nonstop to 57 destinations in the United States, Canada, Mexico, Great Britain, and Japan. Several carriers including Alaska, Southwest, and Spirit have increased their flights to and from San Diego. British Airways is operating nonstop service to London Heathrow Airport from June 1, 2011 with a Boeing 777-200ER, the airline had been flying nonstop to London on its 777-200s; however, the route had originally been flown from Gatwick via Phoenix Sky Harbor International Airport on a Boeing 747-400. On March 27, 2016, British Airways changed the aircraft on this flight from the 3-class 777-200 to the 4-class 777-300, increasing passenger and cargo capacity, and to provide first class seats. But in November 2015

British Airways announced that it would fly its Boeing 747-400 on the London-San Diego route. The last time it flew the 747-400 into this city was in 2003 via Phoenix Sky Harbor.

Japan Airlines began service to Tokyo-Narita on December 2, 2012, using the Boeing 787 aircraft. This is the airport's first nonstop flight to Asia. The flights was temporarily replaced with a 777-200ER. In June, 2013, B787 service resumed, this time daily. In June, 2016, Condor Flugdienst Airlines announced thrice-weekly seasonal service from Frankfurt am Main International Airport to San Diego, Flights being a Boeing 767-300 aircraft. Similarly, in June, 2016, Edelweiss Air announced twice-weekly seasonal service from Zürich Airport, Flights being an Airbus A340-300 aircraft.

4.2. Chaudhary Charan singh International Airport, Lucknow

Chaudhary Charan singh International Airport, Amausi (IATA: LKO, ICAO: VILK) is an international airport 10 KMs away from Main Railway Station of Lucknow, Uttar Pradesh, India. It is managed and operated by the Airport Authority of India. The airport was constructed in 1986, and it was granted international status in May 2012. In 2015, traffic at Lucknow airport have exceeded 3.2 million passengers. The airport have domestic flights and also international flights to Saudi Arabia, UAE, Oman and Singapore. As of March 2016, it is the 12th busiest commercial airport in India in terms of passenger traffic, and is also the second busiest and largest in North and Central India after IGI airport, New Delhi. Chaudhary Charan singh (CCS) International Airport has two terminals: Terminal 1 and Terminal 2; all international arrivals and departures at the airport are handled in Terminal 1, and domestic arrivals and departures are handled at Terminal 2. The airport was awarded AAI's "Best Airport" award in July 2013 along with Jodhpur Airport. Lucknow airport was rated second best in the category of small airports catering to 2-5 million passengers per annum by Airports Council International.

4.2.1. **Runway configuration and landing**

The CCS International Airport consists of a single runway designated as runway 09/27. The airport’s aerodrome reference code is 4D. As per AAI publication in 2007, the runway is an asphalt and concrete design with dimensions of 9,000 feet (2,742 m) x 150 feet (45 m). The estimated Elevation of the runway is 404 ft. / 123.22 m, and the reference temperature is 41 C. CCS International Airport has ILS CAT-II compliant for landing in bad weather and foggy conditions.

Figure 4-2.

The airport have runway strip dimension of 2862 M X 150 M, and its physical characteristics are shown in the Table 3-2 below.

Table 4-2.

VILK AD 2.12 RUNWAY PHYSICAL CHARACTERSTICS

Designations RWY NR	TRUE & MAG BRG	Dimensions of RWY(M)	Strength (PCN) and surface of RWY and SWY	THR coordinates	THR elevation and highest elevation of TDZ of precision APP RWY
1	2	3	4	5	6
09	089.75°Geo 090° Mag	2742X45	70/F/C/W/T upto 2210M from beginning RWY 09 and 70/R/C/W/T for rest Tarmac	264537.9N 0805236.4E	THR123.2M/404FT
27	269.75°Geo 270° Mag	2742X45	70/R/C/W/T upto 532M from beginning RWY27 and 70/F/C/W/T for rest Concrete	264538.7N 0805410.0E	THR121.6M/399FT
Slope of RWY-SWY	SWY dimensions (M)	CWY dimensions (M)	Strip dimensions (M)	OFZ	Remarks
7	8	9	10	11	12
---	---	---	2862X150	---	Nil
---	---	---	2862X150	---	Nil

CCS International Airport have runway end safety areas (RESA) of 90 M X 150 M for RWY 09 and 115 M X 150 M for RWY 27. Table 4-3 below shows the declared distances and classes for the Luknow airport.

Table 4-3. Declared Distances

RWY Designation	TORA (M)	TODA (M)	ASDA (M)	LDA (M)	Remarks
1	2	3	4	5	6
09	2742	2742	2742	2585	RESA 90MX150M
27	2742	2742	2742	2742	RESA 115MX150M

4.2.2. **Current status**

Chaudhary Charan singh International Airport, Lucknow is served by 11 passenger and cargo airlines which fly to 14 destinations in India, Saudi Arabia, UAE, Oman and Singapore. Air India is operating nonstop service to Jeddah King Abdulaziz International Airport with a Boeing **777-300ER**. Saudi Arabian Airlines is operating to Jeddah King Abdulaziz International Airport and Riyadh King Khalid International Airport using the **Airbus A 330**-300 aircraft. Both require category 4E aerodrome, but operates on a category 4D aerodrome with some restrictions.

Other airlines that operates to international as well as national destinations from CCS International Airport such as Air India Express, Jet Airways, Oman Air, Fly Dubai, Go Air, Indigo, Vistara and Tigerair operates aircrafts that require category 4D or lower aerodrome, such as Boeing 737, Airbus A319, A320 and A321 etc.

The nearest major railway station is Lucknow Charbagh railway station which is roughly 10 km from the airport campus. CCS International Airport will be connected through Lucknow Metro by a terminal station on the North-South Corridor Line.

5. Social & Financial Aspect:

Calicut International Airport known locally as Karipur Airport, was the 12th busiest airport in India in terms of passenger turnout. As a direct effect of the partial closure, the Calicut International Airport has been dropped from the 12th to the 16th position of busiest commercial airport in India in terms of passenger traffic, it is also noted that there is a huge impact on the Cargo movement without wide-body aircraft on the route, as majority of the cargo from Calicut airport are perishables and was sent to Saudi Arabia and UAE.

20 Busiest Airports in India (Apr 2015 - Mar 2016)

Airport	IATA Code	Passengers (in millions)	Aircraft Movements	Aircraft Movements/day	Cargo in tons ('000) Apr '11-Mar '12
1. Delhi	DEL	48.42			600
2. Mumbai	BOM	41.67			670
4. Bengaluru	BLR	18.97			227 (2012)
3. Chennai	MAA	15.22			389
5. Kolkata	CCU	12.42			130
6. Hyderabad	HYD	12.39			78
7. Kochi (CIAL)	COK	7.75			41
8. Ahmedabad	AMD	6.48			28
9. Pune	PNQ	5.42			28
10. Goa (Dabolim)	GOI	5.38			7
11. Thiruvananthapuram	TRV	3.47			39
12. Lucknow	LKO	3.24			4
13. Jaipur	JAI	2.89			9
14. Guwahati	GAU	2.78			9
15. Srinagar	SXR	2.31			2
16. Kozhikode	CCJ	2.31			22
17. Bhubaneswar	BBI	1.89			3
18. Visakhapatnam	VTZ	1.80			
19. Coimbatore	CJB	1.69			7
20. Nagpur	NAG	1.60			9

Figure 5-1.

Immediately after suspending the wide-body aircrafts at Karipur Airport, those services were shifted to Kochi International Airport and thus a good share of passengers moved to Kochi. Though it has adversely affected the revenue of Karipur Airport, revenue of Kochi Airport which is owned by a Private limited company CIAL, marked steep growth. The government owned Calicut Airport has suffered 30 percent loss as a result of the shifting of airlines such as Saudia, Emirates and Air India to Kochi since May 2015. Whereas, CIAL has registered 21 per cent growth in its net profit at ₹175.22 Crore in FY 2016, the company's turnover also posted a 27 per cent growth at ₹524.53 Crore. It's investors are eligible for a total dividend payout of nearly ₹110 Crore, an increase of 178 per cent since 2003-04. These figures clearly shows that after suspending wide body flights in Karipur, CIAL marks tremendous growth

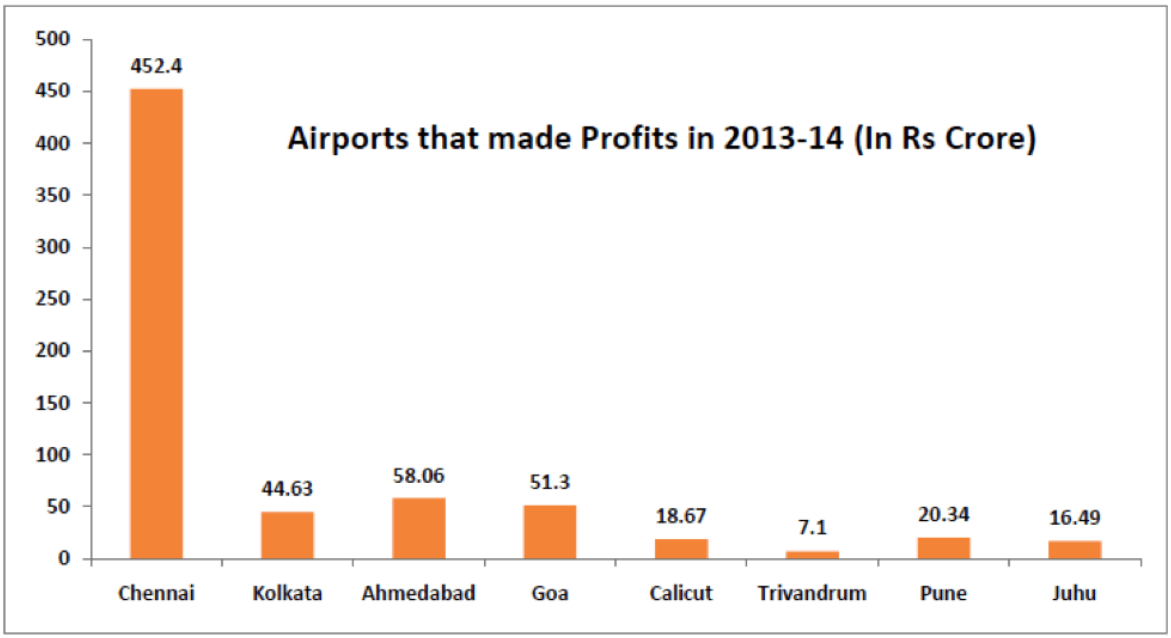

Figure 5-2.

Therefore, as long as the AAI denies the May 2015 status quo in Karipur, CIAL is the sole beneficiary until Kannur Airport begins its operation. This may be one of the reasons why the Government officials and political parties are not showing any interest in bringing back Calicut Airport to the limelight. The denial of landing rights for wide body aircrafts in Calicut International Airport even after the completion of Phase 1 works, has caused tremendous miseries to expatriates and their families. The impact of Suspension of Wide-bodied Aircrafts can be summarized as:

a) Decrease of more than 2500 passenger seats.

b) More than 30% loss in revenue for the Public sector airport. In FY 2013-14, there was recorded a profit of 18.67 Crore.

c) More than 80% loss in cargo revenue. In terms of cargo business, the Airport was placed 11th among Indian Airports.

d) Adverse impact on local business, tourism sector, taxi services etc.

In addition to that the statements being made by some senior airport and AAI officials without any solid technical backing are creating serious doubt among the public regarding the intention behind delaying the resumption of suspended aircrafts. For example the former airport Director K Janardhanan said: 'The short runway was a major hurdle in operating the wide-bodied aircraft from the table top airport and the runway length should be extended from the current 2,850 meter to 3,150 meter to operate wide-bodied aircraft, he added. The major hurdle in extending the runway is the delay in acquiring the land which require a total of 385 acres of land for extending

the runway and associated facilities. The state government has been finding the task difficult as it requires evacuation of 1500 families living around the airport'. The term 'Table Top Airport' is never heard of in any international arena, and the hysteria created around it is unwarranted for.

Though Airlines such as Saudia, Air India and Emirates have expressed their willingness to resume flights to Karipur, Airports Authority reiterates their stand that unless and until the proposed developments are carried out, no wide-bodied aircrafts would be allowed. It's suspected that the AAI's move is to put pressure on local residents to make them accept AAI's demand for acquiring 385 care land for further 'development'. Citing the re-carpeting work, Haj / Umra operation have also been shifted to Kochi for two consecutive tears. The community at large believe that AAI's decision to deny the service of wide-bodied flights was taken to support business interests of the investors in Kochi and Kannur airports. Shares of Kannur airport were reportedly sold out after the suspension of wide body aircraft in Karipur on May 1, 2015.

6. Conclusion

Calicut International Airport was needed to undergo runway strengthening and re-carpeting work like any international airport during the course of its operation. It is understandable that wide body aircrafts had to be suspended from 12 November 2015 to 30th April 2016, to carry out the scheduled Phase 1 of runway strengthening and re-carpeting work, as the effective runway length was reduced to 2450 meters during this period, and the available runway length during this period was insufficient for the operation of such aircrafts.

But, even after the completion of scheduled period for Phase 1 of the runway strengthening and re-carpeting work, and the effective length of the runway 10 / 28 being 2850 meters during the scheduled period of Phase 2 work of resurfacing and strengthening work, the suspended wide body aircrafts of Air India, Saudi Arabian Airlines and Emirates have not been reinstated. The period starting from 1st May 2016 is considered as the peak travelling season from the area, and the laxity from the part of airport management and the authorities are causing huge revenue losses for the government agencies, and the travelers are forced to pay skyrocketing prices for the available tickets to their chosen destinations.

From the desktop study that was conducted regarding the Status & Future of Calicut (Karipur) International Airport and comparing it with similar international and national airports, we have arrived to the following observations and facts that needs to considered and taken into account by the responsible agencies:

1. As per the official information provided by the Airport Authority of India, Calicut International Airport is a code number 4 and code letter D airport, with code letter E class operation permitted with Pay Load restriction for B747-400, B777 and A330.
2. The airport meets the minimum length and width of the runway required in the Aerodrome Design Manual published by ICAO for category 4D and 4E type of operation, and the type of aircraft that can be operated on this runway is determined by the reference field length required for each category of aircraft and its allowed maximum Pay Load beside other factors.
3. The airport Elevation and Aerodrome Reference Temperature will not make any significant variation in the reference field length required for the runway, as the airport is **not considered as a high altitude airport**.
4. Internationally recognized manuals shows the reference field length required for each type of aircraft, with the expectation of minor site specific variations, it clearly shows that declared runway length of Calicut Airport (2850 m) is more than or equal to the reference field length required by ICAO for all code 4D and several 4E aircrafts.
5. The provided graded runway strip dimension for the airport is 2980 m X 150 m, and the available width of the land throughout the length of runway strip varies from about 300 m to 360 meters, and if needed the width of the runway strip can be extended to 300 m by the construction vertical retaining wall on both sides of the way, the details of which needs to studied in detail.

6. As per ICAO Aerodrome Design Manual the width of runway strip including **a precision approach runway** shall extent laterally to a distance of at least 150 meters on each side of the center line of the runway and its extended centerline throughout the length of the strip **wherever practicable only, when the code number is 3 or 4.** And the width of runway strip including a non-instrument runway shall extend on each side of the center line of the runway and its extended centerline throughout the length of the strip, to a distance of at least 75 meter, for the same code number is 3 or 4. Since, Calicut International Airport is considered to have a **Precision Approach runway**, as the landing aids such as Instrument Landing System (ILS) Category –I, and PAPI are available for both RWY 10 and RWY 28; which implies that the available width of the runway strip (150 m) meets the ICAO requirement.
7. Provided RESA for both RWY10 and RWY28 meets ICAO requirement, additional recommended area can be constructed if needed on east side with the available land, if land is not available on west side EMAS similar to San Diego can be considered if needed.
8. Runway surface strength was an issue before the partial closure of the airport, thankfully after completion of Phase 1 of runway resurfacing and strengthening work, the PCN have increased from 56 to 75 as per unofficial information, which is more than that is required for all wide body aircrafts that have been operating and can be operated at Calicut Airport's Aerodrome.
9. Learning from the experience of other international and national airports that have similar runway length and located at an altitude less 500 meters such as San Diego International Airport, and CCS International Airport, Lucknow and previous experience of Calicut Airport itself, other code 4E wide-body aircrafts such as **Boeing 747-400**, **B777-200 ER, B777-300ER, B777-300** etc. can be operated from Calicut International Airport with pay load restriction.
10. The hysteria created by a section in airport management and the media that Calicut International Airport is a 'Table Top Airport' and it is unsafe for aircrafts to land and take off from such an airport, and there are chances that the aircrafts may fall and crash off the runway strip into the valley, are completely unwarranted for and does not have any authentic backing from the internationally accepted regulatory organizations. Moreover, these kind of propaganda is unleashed at a time when most international airports including Calicut Airport are using technologically advanced precision approach systems for landing and take-off of the aircraft.

Closing Statement:

Runway Meets Requirements for Operation of Suspended Aircrafts

References:

1. Aerodrome Design Manual; Part 1 Runways, International Civil Aviation Organization (ICAO), Third Edition – 2006, Doc No. 9157 AN/901.
2. Manual on Aerodrome Licensing of AAI Airports, Airport Authority of India (AAI), Date of Issue - January 2013.
3. Aerodrome Manual , Calicut International Airport, November 2012 (Second Edition, Ver.1). Doc No. VOCL / ATM / 2011 / V1-01-MADM
4. Standardized Method of Reporting Airport Pavement Strength – PCN, Advisory Circular No. 150/5335-5B dated 26/8/2011, Federal Aviation Administration, U.S. DoT.
5. Other references shall be provided upon request.

The Status & Future of Calicut International Airport

Technical Study Report

തയ്യാറാക്കിയത്:
യാസിർ എം അബ്ദുല്ല
മെഹർ നൗഷാദ്

പ്രസാധനം:
വെൽഫെയർ പാർട്ടി കേരള

CULTURAL FORUM

വിതരണം:
കൾചറൽ ഫോറം
ദോഹ-ഖത്തർ