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**A
AIC**
Circular NR 01
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**NEW METHOD
ACR - PCR
(Aircraft Classification Rating) - (Pavement Classification Rating)**

1. GENERAL

- 1.1 From **30 OCT 2025**, Uruguay shall begin incorporating to the publications, the new concept: Aircraft Classification Rating – Pavement Classification Rating (ACR-PCR), adopted by the International Civil Aviation Organization (ICAO).
- 1.2 The ACR-PCR is a new method of reporting the strength of airport pavements:
 - a) based on a layer elastic analysis (LEA);
 - b) valid for both rigid and flexible pavements;
 - c) where aircraft whose platform mass is greater than 5.700 KG (12.500 LBS) shall operate.
- 1.3 This new method replaces the ACN-PCN method that has been used until now.

2. BENEFITS

- 2.1 For airport operators: offers a more accurate assessment of the strength of airport pavements, providing a better understanding of the useful life of the pavement and facilitating the optimization of its use.
- 2.2 For the industry: aircraft manufacturers shall have the possibility of developing new landing gear configurations that are increasingly more efficient in transferring loads to the pavement, minimizing damage to infrastructure.
- 2.3 For airport users: fewer possible restrictions on the use of pavements at airports, due to the weight of the aircraft.

3. CONCEPTS

- 3.1 Aircraft Classification Rating (ACR)
 - 3.1.1 Determining the ACR of an aircraft involves obtaining the relative effect that it causes on the pavement, according to the configuration of its landing gear, the inflation pressure of the tires and its allowable operating weight on the aerodrome.

3.1.2 The maximum ACR of an aircraft is calculated with the mass and centre of gravity that produce the maximum load of the main landing gear on the pavement. The aircraft's tires are considered to be inflated following the manufacturers' recommendation.

3.1.3 The ACR value for a given aircraft can be obtained:

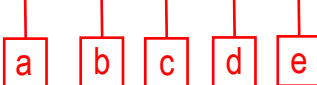
- a) directly from the aircraft manufacturer (Airplane Characteristics for Airport Planning – ACAP);
- b) calculate it based on the information that can be obtained on the ICAO website where specific information is available, whatever the mass, on rigid and flexible pavements;
- c) from a free application, which can be downloaded from the URL:
<https://www.airporttech.tc.faa.gov/Products/Airport-Safety-Papers-Publications/Airport-Safety-Detail/icao-acr-13>

3.2 Pavement Classification Rating (PCR)

3.2.1 The PCR methodology uses a coded format to maximize the amount of information contained in a minimum number of characters and facilitate the computerization provided and represents the load capacity of the pavement for unrestricted operations.

3.2.2 In this respect, the code consists of five parts separated by diagonal bars:

PCR 000/ X / X / X / X



a = PCR numerical value /

b = pavement type /

c = subgrade strength category /

d = tire pressure /

e = evaluation method used to determine PCR

3.2.3 The **PCR numerical value** represents the relative load capacity of a pavement in terms of a standardized single wheel load at a tire inflation pressure of 1.5 MPa (218 PSI). This value must be reported in whole numbers, rounded to the nearest whole number.

3.2.4 In the case of having an infrastructure (runway, taxiway or apron) with sections of various strengths, the PCR to be reported shall be that of the segment with the lowest numerical value (lowest load capacity).

3.2.5 Note.— If the segment of least strength is not located in a frequently travelled area of the runway or taxiway, the best engineering criteria should be used to choose another representative sector and notify the corresponding PCR.

- 3.2.6 The two **pavement types** commonly used are called flexible and rigid pavements and the reference for this category is:

<i>Pavement type</i>	<i>Código</i>
Flexible pavement	F
Rigid pavement	R

- 3.2.7 If the actual construction constitutes a composite or non-standard pavement, include a note to that effect. In this sense, the type of pavement that most accurately reflects the structural behaviour of the pavement must be reported.

- 3.2.8 There are four **subgrade strength** category values, both for flexible and rigid pavements, according to the elasticity module of a material (E):

<i>Category</i>	<i>Range</i>	<i>Type Value</i>	<i>Code</i>
High	$E \geq 150 \text{ MPa (21.756 PSI)}$	200 MPa (29.008 PSI)	A
Medium	$150 \text{ MPa (21.756 PSI)} > E \geq 100 \text{ MPa (14.504 PSI)}$	120 MPa (17.405 PSI)	B
Low	$100 \text{ MPa (14.504 PSI)} > E \geq 60 \text{ MPa (8.702 PSI)}$	80 MPa (11.603 PSI)	C
Ultra-low	$E < 60 \text{ MPa (8.702 PSI)}$	50 MPa (7.252 PSI)	D

- 3.2.9 The maximum permissible **tire pressure** category that a pavement surface can withstand is expressed in defined terms, according to the following detail:

<i>Category</i>	<i>Tire pressure</i>	<i>Code</i>
Unlimited	No pressure limit	W
High	Pressure limited to 1.75 MPa (254 PSI)	X
Medium	Pressure limited to 1.25 MPa (181 PSI)	Y
Low	Pressure limited to 0.50 MPa (73 PSI)	Z

- 3.2.10 This new method recognizes two **evaluation methods** used to determine the PCR of a pavement:

<i>Evaluation</i>	<i>Description</i>	<i>Code</i>
Technique	It consists of a specific study of the characteristics of the pavements and the types of aircraft for which you intend to serve.	T
Taking advantage of experience in the use of aircraft	Includes knowledge of the specific type and mass of aircraft that pavements satisfactorily withstand under normal conditions of use.	U

4. APPLICATION

We shall now consider some examples of how to apply this new method based on the following problems.

4.1 Problem Statement I

Given a runway with a strength defined by the value: $PCR = 480/R/B/W/T$; and an aircraft = Airbus, A320-100.

The question is: can the aircraft operate on a runway with that strength?

4.1.1 Solution to Problem I

The solution to the problem shall consist of 3 parts:

- Obtain the ACR for the given aircraft;
- Obtain the PCR for the surface on which you are going to operate;
- Compare ACR versus PCR and know whether or not it is possible to operate on the surface.

4.1.2 Obtain the ACR

4.1.2.1 Option 1 - ACR

Obtain the ACR for the aircraft from the free application that we previously downloaded and installed (ICAO-ACR) to operate on the surface.

ICAO-ACR Version 1.32 Date December 9, 2020

Input Data

Pavement Type ☐ Flexible ☒ Rigid

Gross Weight (lbs)

Percent GW

Number of Wheels

Tire Pressure (psi)

Wheel Coordinates (in)

No	X	Y
1	-18.25	0.00
2	18.25	0.00

Select Airplane Group

Select Airplane

Calculate ACR *

☐ Display Select Wheels (SW) ☐ Metric

Subgrade Category	Subgrade Modulus [psi]	Rigid ACR Number	ACR Thickness t [in]
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Input Data - Gear 2

Percent GW 2

Number of Wheels 2

Tire Pressure 2 (psi)

Wheel Coordinates (in)

No	X	Y
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a) Now, we select certain parameters before performing the calculation.

- (1) Select the pavement type, according to the type indicated in the PCR.

Input Data

Pavement Type ☐ Flexible ☒ Rigid

In our case the value of PCR = 480 / **R** / B / W / T, which is indicating a type of pavement **R = Rigid**.

Therefore, we choose the option:

Input Data

Pavement Type ☐ Flexible ☒ Rigid

- (2) Select the Airplane Group and then Select the airplane.

Select Airplane Group Airbus

Select Airplane A320-100

In our case the **Airbus, A320-100**. We search the Aircraft Group, select the brand, and then the aircraft itself.

Therefore, we choose the option:

Select Airplane Group Airbus

Select Airplane A320-100

- (3) If necessary, the gross weight of the aircraft is adjusted.

Gross Weight (lbs) 150.796

Report GW 0.470

- (4) Finally, we shall calculate the ACR for the aircraft and the selected parameters.

Calculate ACR *

- (5) Result.

Subgrade Category	Subgrade Modulus [psi]	Rigid ACR Number	ACR Thickness t [in]
D	7.251,89	459,66	13,25
C	11.603,02	444,19	12,51
B	17.404,53	429,52	11,84
A	29.007,55	409,06	10,94

Input Data

Pavement Type ☐ Flexible ☒ Rigid

Gross Weight (lbs) 150,796

Percent GW 0,470

Number of Wheels 2

Tire Pressure (psi) 200,15

Wheel Coordinates (in)

No	X	Y
1	-18,25	0,00
2	18,25	0,00

Select Airplane Group Airbus

Select Airplane A320-100

Calculate ACR *

☐ Display Select Wheels (SW) ☐ Metric

Subgrade Category	Subgrade Modulus [psi]	Rigid ACR Number	ACR Thickness t [in]
D	7.251,89	459,66	13,25
C	11.603,02	444,19	12,51
B	17.404,53	429,52	11,84
A	29.007,55	409,06	10,94

Calculation time: 1,21 sec.

Input Data - Gear 2

Percent GW 2

Number of Wheels 2

Tire Pressure 2 (psi)

Wheel Coordinates (in)

No	X	Y

In our case, the value of the $PCR = 480 / R / B / W / T$, T, indicates that the strength category of the foundation soil is **B**, therefore, from the result, we must choose the ACR corresponding to the strength category of the soil of foundation **B**.

Subgrade Category	Subgrade Modulus [psi]	Rigid ACR Number	ACR Thickness t [in]
D	7.251,89	459,66	13,25
C	11.603,02	444,19	12,51
B	17.404,53	429,52	11,84
A	29.007,55	409,06	10,94

b) Final result: for:

- an aircraft = **Airbus, A320-100**;
- that will operate on a runway with **PCR = 480/R/B/W/T**;

We approximate the value 429.52, and we obtain the **ACR = 430**

4.1.2.2 Option 2 - ACR

Review the documentation corresponding to the aircraft (Airplane Characteristics for Airport Planning – ACAP) or consult the manufacturer directly for the ACR value.

4.1.2.3 Option 3 - ACR

Search the ICAO website for the information necessary to perform the corresponding calculations, taking into account that the $PCR = 480 / R / B / W / T$, indicates a Rigid pavement (R), and the subgrade category of foundation is B.


4.1.3 Obtain the PCR

The question in this case is: where do I get the PCR value?

4.1.3.1 Solution - PCR

- a) In general, the value of a PCR can be obtained directly in the AIP Uruguay, section AD, depending on the aerodrome we are looking for, in the sections: “Aprons, Taxiways and Check Locations/Positions Data”, “Runway Physical Characteristics”, “Aerodrome/Heliport Chart”.

SUMU AD 2.9-8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	<i>Apron surface and strength</i>	Surface: SE apron: concrete and asphaltic concrete. Commercial Apron I: concrete. Commercial Apron II: Concrete. Strength: Commercial Apron II: 82/R/C/X/U and 88/F/C/W/U; SE: 23/F/C/X/T, Commercial Apron I: 82/R/C/X/U
2	<i>Taxiway width, surface and strength</i>	Width: 23 M Surface: asphaltic concrete Strength: TWY A: 88/F/C/W/U. ✈ TWY B BTN TWY D and RWY 25: 82/R/C/X/U and 88/F/C/W/U.  TWY F: 23/F/C/X/T. ✈ TWY C BTN RWY 07-25 and Apron: 88/F/C/W/U. ✈ TWY C BTN RWY 07-25 and RWY 01-19: 40/F/C/X/T. TWY D: 82/R/C/X/U. TWY E: 88/F/C/W/U. TWY G: 82/R/C/X/U

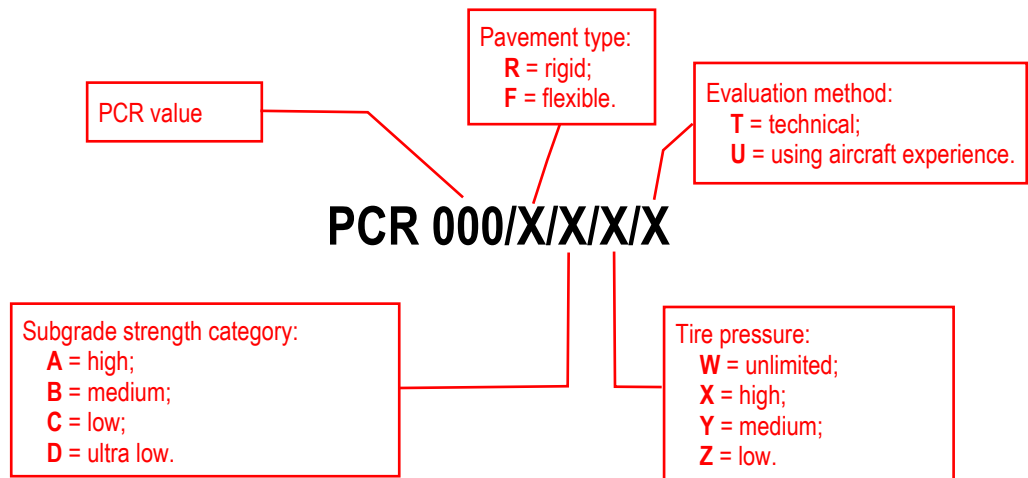
SUMU AD 2.9-12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	TRUE BRG	Dimensions of RWY (M)	Strength (PCN) and surface of RWY and SWY	THR coordinates. RWY end coordinates. THR geoid undulation	THR elevation and highest elevation of TDZ of precision APP RWY
1	2	3	4	5	6
07	053.54°	3 200 x 45	88/F/C/W/U Concrete and asphaltic concrete	345031.64S 0560212.96W 345038.38S 0560224.04W GUND 14.0 M	THR 18 M/59 FT TDZ 22 M/72 FT
25	233.53°	3 200 x 45	88/F/C/W/U Hormigón y concreto asfáltico	344939.56S 0560047.49W 344936.68S 0560042.75W GUND 14.0 M	THR 31 M/102 FT TDZ 31 M/102 FT

AERODROME/HELIPORT CHART - ICAO		34°50'02"S 056°01'41"W	ELEV 32 (105)	TWR 118.1 - 121.8 APRON 000.0	MONTEVIDEO/Int Carrasco "Gral. Cesareo L. Berisso"	
	RWY	DIRECTION	THR	GUND	BEARING STRENGTH	
07	065°	34°50'31.64"S 56°02'12.96"W	14.0 M	Runway PCN 88/F/C/W/U		
25	245°	34°49'39.56"S 56°00'47.49"W	14.0 M			
01	010°	34°50'31.09"S 56°01'50.65"W	14.0 M	Runway PCN 55/F/C/W/T		
19	190°	34°49'18.08"S 56°01'51.56"W	14.0 M			
Taxiway "A".				PCN 88/F/C/W/U		
Taxiway "B" BTN				PCN 82/R/C/X/U		

(NOTE: the values that appear on the AIP sheets correspond to PCN, but as of 30 OCT 2025 they shall be PCR as indicated)

- b) Once we locate the surface we are considering (apron, runway, taxiway, etc.), we shall look for its strength, which shall be indicated in the following format:



c) That value found, indicated as “strength” or “(PCR) strength”, shall be the value to take into account.

For our exercise it would be:

Value = 480;
Pavement type = R (rigid);
Subgrade strength category = B (medium);
Tire pressure = W (unlimited);
Evaluation method = T (technical);

which would be represented as:

PCR = 480/R/B/W/T

4.1.4 Compare ACR versus PCR

We have obtained the following ACR and PCR values:

ACR = 430
PCR = 480/R/B/W/T

so, we have to make the comparison between the ACR and the PCR value, as follows:

If $ACR \leq PCR \rightarrow$ **the aircraft can operate** on the pavement without restrictions

If $ACR > PCR \rightarrow$ **the aircraft cannot operate or may be permitted to operate subject to:**

- If ACR exceeds PCR value by up to 10%:

The operation may be carried out, as long as the annual number of movements with overload does not exceed 5% of the total annual movements of the aircraft at the aerodrome (excluding aircraft weighing less than 5,700 KG).

- If ACR exceeds PCR value by more than 10%:
Each operation must be evaluated on a case-by-case basis.

(NOTE: In the case where the ACR > PCR, the Airport Operator must be consulted)

For our case:

$430 \leq 480$, that is

ACR is \leq PCR therefore \rightarrow the aircraft can operate

4.2 Problem Statement II

Given a taxiway with a strength defined by the value: PCR = 350/F/A/W/T; and an aircraft = Boeing, B737-800.

The question is: can the aircraft operate on a taxiway with that strength?

4.2.1 Solution to Problem II

The solution to the problem shall consist of 3 parts:

- Obtain the ACR for the given aircraft;

We use the ICAO-ACR application, selecting Flexible pavement, the Boeing aircraft, B737-800, subgrade category: A, and we obtain the value 377.45, which we shall round to 378.

ICAO-ACR Version 1.32 Date December 9, 2020

Input Data

Pavement Type: ☒ Flexible ☐ Rigid

Gross Weight (lbs): 174,700

Percent GW: 0.936

Number of Wheels: 4

Tire Pressure (psi): 204.00

Wheel Coordinates (in)

No	X	Y
1	-138.00	0.00
2	-104.00	0.00
3	138.00	0.00
4	104.00	0.00

Select Airplane Group: Boeing

Select Airplane: B737-800

Calculate ACR *

☐ Display Select Wheels (SW) ☐ Metric

Subgrade Category	Subgrade Modulus [psi]	Flexible ACR Number	ACR Thickness t [in]
D	7,251.89	507.79	30.89
C	11,603.02	448.34	25.15
B	17,404.53	410.28	21.11
A	29,007.55	377.45	16.46

Input Data - Gear 2

Calculation time: 2.55 sec.

- Obtain the PCR for the surface on which you are going to operate;

In this case, it is the one indicated in the problem statement: PCR 350/F/A/W/T.

- c) Compare ACR versus PCR and know whether or not it is possible to operate on the surface.

We compare the value of ACR (378) with the one of PCR (350)

$$378 > 350 \text{ therefore } ACR > PCR$$

In this case, the ACR exceeds the PCR value by up to 10%, so the operation can be carried out, as long as the annual number of movements with overload does not exceed 5% of the total annual movements of the aircraft at the aerodrome. It is recommended to consult the Airport Operator.

4.3 Problem Statement III

Given a platform with a strength defined by the value: $PCR = 700/R/D/W/T$; and an aircraft = Airbus, A-380.

The question is: can the aircraft operate on a platform with that strength?

4.3.1 Solution to Problem III

The solution to the problem shall consist of 3 parts:

- a) Obtain the ACR for the given aircraft;

We use the ICAO-ACR application, selecting Flexible pavement, the Airbus, A-380, subgrade category: D, and we obtain the value 1161.06, which we shall round to 1162.

ICAO-ACR Version 1.32 Date December 9, 2020

Input Data

Pavement Type: ☐ Flexible ☒ Rigid

Gross Weight (lbs): 1,238,998

Percent GW: 0.190

Number of Wheels: 4

Tire Pressure (psi): 217.60

Wheel Coordinates (in)

No	X	Y
1	-26.57	66.93
2	-26.57	0.00
3	26.57	0.00
4	26.57	66.93

Select Airplane Group: Airbus

Select Airplane: A380

Calculate ACR *

☐ Display Select Wheels (SW) ☐ Metric

Subgrade Category	Subgrade Modulus [psi]	Rigid ACR Number	ACR Thickness t [in]
D	7,251.89	1,161.06	21.13
C	11,603.02	977.44	18.62
B	17,404.53	816.23	16.37
A	29,007.55	641.55	13.74

Input Data - Gear 2

Calculation time: 3.57 sec.

- b) Obtain the PCR for the surface on which you are going to operate;

In this case, it is the one indicated in the problem statement: $PCR = 700/R/D/W/T$.

- c) Compare ACR versus PCR and know whether or not it is possible to operate on the surface.

We compare the value of ACR (1162) with the one of PCR (700):

$$1162 > 700 \text{ therefore } ACR > PCR$$

In this case the ACR exceeds the PCR value by more than 10%, so the operation must be specifically evaluated. It is recommended to consult the Airport Operator.

5. DEFINITIONS

Aircraft classification rating (ACR). A number that expresses the relative effect of an aircraft at a given configuration on a pavement structure for a specified standard subgrade strength.

Pavement classification rating (PCR). A number that expresses the load-carrying capacity of a pavement for unrestricted operations.

Elasticity module (E). The Elasticity module of a material is a measure of its rigidity. It is equal to the relationship between the applied stress and the resulting elastic deformation.

Acronyms:

ACR: Aircraft classification rating

PCR: Pavement classification rating

MPa: Megapascal

PSI: Pound per square inch

