ICAO AERODROME PAVEMENT WORKSHOP

ACR/PCR Discussion Topics



ACR/PCR Discussion Topics

- Criteria for occasional overloads
- Tire pressure limitations
- Overlay structures
- Using Aircraft PCR example
- Resources
- Open discussion





Criteria for Occasional Overloads

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Occasional Overloads

- The PCR should not be considered as a "hard" limit, nor as the maximum absolute pavement bearing strength.
- Annex 14 allows overload operations when ACR>PCR:
 - "ICAO allowance" is increased to 10% of the PCR for both flexible and rigid pavements
 - Overloads in excess of 10% may be allowed if justified through a technical analysis of the impact on pavement damage.



ACR/PCR Topics



Annex 14 on Overloads

20.1.1 ... For those operations in which **magnitude of overload and/or the frequency of use do not justify a detailed analysis**, the following criteria are **suggested**:

a) for flexible and rigid pavements, occasional movements by aircraft with ACR not exceeding 10 per cent above the reported PCR should not adversely affect the pavement;

b) the annual number of overload movements should not exceed approximately 5 per cent of the total annual movements, excluding light aircraft.

20.1.2 Such overload movements should not normally be permitted on pavement exhibiting signs of distress or failure. Furthermore, overloading should be **avoided during any periods of** thaw following frost penetration, or when the strength of the pavement or its **subgrade could be weakened by water.** Where overload operations are conducted, the appropriate authority should review the relevant pavement condition regularly, and should also review the criteria for overload operations periodically since excessive repetition of overloads can cause severe shortening of pavement life or require major rehabilitation of pavement.



Overloads – Key Points

- ICAO Annex 14 criteria are <u>suggested</u>. State criteria can and do deviate from these in practice.
- Allows technical analysis in lieu of default criteria.
- Amendment 15 increased allowable overload for rigid pavements from 5% to 10% (ACR over reported PCR).
 - Provides parity with flexible pavements.
 - Based on R&D performed at FAA Technical Center.
- Allowable annual overload movements set at approximately 5% of total movements.
 - Total excludes "light" aircraft that do not contribute significantly to CDF.
 - "Light aircraft" not defined.



Overload Example

- Consider a flexible pavement section.
- Existing Traffic:

		Gross	Annual
No.	Aircraft	Wt., kg	Departures
	A330-300 WV 022	233,900	52
2	A321-200 opt	93,900	1,560
3	A320-200 opt	78,400	10,950
4	B737-900 ER	85,366	10,950
5	PA-28-R-200 Cherokee Arrow	1,134	30,000



• Q: Can airport operate 52 annual departures of B777-300 ER?

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Overload Example

- For existing traffic, FAARFIELD gives PCR 598/F/B/X/T.
 - No restrictions on existing traffic.
 - A330-300 is the critical aircraft.
 - Report as **600/F/B/X/T**.
- Allowable ACR for overloads is 1.1
 × 600 = 660/F/B.
- Allowable number of overload operations = 0.05 × 23,512 = 1,176 (say 1200 ops per year).
- Disregard 30,000 annual departures of "light aircraft" Piper Cherokee.

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Section											
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Pavement Layer	rs					PCR = 598/F	-/B/X/1				
Pavement Typ	New Flexible		~								
Material		Thickness (m	im) E (MP	a) CBR							
P-401/P-4	403 HMA Surface	100	1,378.9	95							
P-401/P-4	403 HMA Stabilized	125	2,757.9	90							
> P-209 Cru	ushed Aggregate	375	365.55	5							
Subgrade			103.42	2 10							
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ACR/PCR Topics



Overload Example (continued)

PCR GRAPH



			AARFIELD 2.0.18 (Build 05/	26/2022)				
J	ob Name: Overload Exa	mple						
	ection: Flexible Section							
n	his file name = PCR Results fo	r New Flexible 20	22-06-17 12:46:31					
Ē١	valuation pavement type is fle	xible and design	program is FAARFIELD.					
50	ection name: Flexible Section	in job file: Overl	oad Example.JOB.xml					
J	nits = Metric							
	nalysis Type: New Flexible							
54	ubgrade Modulus =103.42MPa	(Subgrade Catego	ry is B)					
Ē١	valuation Pavement Thickness	= 600 mm						
2	ass to Traffic Cycle (PtoTC) Ra	atio = 1.00						
M	aximum number of wheels pe	r gear = 4						
	DF = 0.990							
4	t least one aircraft has 4 or m	ore wheels per ge	ear.					
	treast one uncluit has for his							
		Res	ults Table 1. Input Tr	affic Data				
	Aircraft Name	Res Gross Weight (kg)	ults Table 1. Input Tr Percent Gross Weight	raffic Data Tire Pressure (MPa)	Anns	ual Departure	20 Years	Coverage
	Aircraft Name A330-300 WV022	Res Gross Weight (kg) 233,900	ults Table 1. Input Tr Percent Gross Weight 95.80	Tire Pressure (MPa) 1,420.32	Anna 52	ual Departure	20 Years	Coverage
	Aircraft Name A330-300 WV022 B737-900 ER	Res Gross Weight (kg) 233,900 85,366 78,400	ults Table 1. Input Tr Percent Gross Weight 95.80 94.60 92.80	Tire Pressure (/Pa) 1,420.32 1,516.85	Anna 52 10,99	ual Departure	20 Years 698 164,330	. Coverage
	Aircraft Name A330-300 WV022 B737-800 ER A320-200 opt A321-200 opt	Res Gross Weight (kg) 233,900 85,366 78,400 93,900	ults Table 1. Input Tr Percent Gross Weight 95.80 94.60 92.80 94.60	Tire Pressure (MPa) 1,420.32 1,516.85 1,441.00 1,500.30	Anna 52 10,99 1,560	ual Departure 50 50	20 Years 698 164,330 166,313 24,109	Coverage
	Aircraft Name A330-300 W022 8737-900 ER A320-200 opt A321-200 opt PA-28R-200 Cherokee Arrow	Res Gross Weight (kg) 233,900 85,366 78,400 93,900 1,134	Ults Table 1. Input Tr Percent Gross Weight 95.80 94.60 92.80 94.60 95.00	Tire Pressure (MPa) 1,420.32 1,516.85 1,541.00 1,500.30 344.74	Anna 52 10,99 10,99 1,560 30,00	ual Departure 50 50 50 50 50	20 Years 698 164,330 166,313 24,109 211,530	. Coverage
	Aircraft Name A330-300 WV022 B737-60 ER A330-200 opt A320-200 opt PA-288-200 Cherokee Arrow	Res Gross Weight (kg) 233,900 85,366 78,400 93,900 1,134	Ults Table 1. Input Tr Percent Gross Weight 95.80 94.60 92.80 94.60 95.00 Results Table 2. PCR	raffic Data Tire Pressure (MPa) 1,420.32 1,516.85 1,441.00 1,500.30 344.74 Value	Anna 52 10,99 10,99 1,560 30,00	ual Departure 50 50 50 50 50 50	20 Years 698 164,330 166,313 24,109 211,530	. Coverage

PCR REPORT

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Overload Example (continued)

No.	Aircraft Name	Gross Weight (kg)	Percent Gross Weight on Main Gear	Tire Pressure (MPa)	ACR Thick (mm) (B)	ACR/F/B
1	A330-300 WV022	233,900	95.8	1,420.32	627	597.8
2	B737-900 ER	85,366	94.6	1,516.85	561	460.6
3	A320-200 opt	78,400	92.8	1,441.00	526	391.7
4	A321-200 opt	93,900	94.6	1,500.30	579	500.8
5	PA-28R-200 Cherokee Arrow	1,134	95	344.74	117	8.8
6	B777-300 ER	352,441	92.4	1,503.06	638	628.8

Results Table 3. New Flexible ACR at Indicated Gross Weight and Strength

- In FAARFIELD 2.0, compute ACR of B777-300 ER at operating weight 352,441 kg = 628.8/F/B
- Since ACR 629 < 660, overload operations are allowed.
- The proposed number of annual overload operations (52) is less than the limit of 1200.
- The airport should nevertheless inspect the pavement for damage after each overload op.





Tire Pressure Limitations

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ACR-PCR Tire Pressure Categories

OLD ACN/PCN Tire Pressure Categories (Modified by ICAO State Letter in 2011)

NEW Tire Pressure Categories (No Change in ACR/PCR System)

Category	Code	Range	Category	Code	Range
Unlimited	W	No limit	Unlimited	W	No limit
High	Х	< 1.50 MPa	High	Х	< 1.75 MPa
Medium	Y	< 1.00 MPa	Medium	Y	< 1.25 MPa
Low	Z	< 0.5 MPa	Low	Z	< 0.5 MPa

ACR/PCR Topics



High Tire Pressure Full-Scale Testing Program

Arose from concerns among aircraft manufacturers that:

"The four tire pressure categories assigned to the PCN rating, which may have been representative of the aircraft existing at its inception, are no longer representative of the current fleet of large wide bodied aircraft operating with higher wheel loads and higher tire pressures."

M.J. Roginski, Effects of Aircraft Tire Pressures on Flexible Pavements, PIARC 2007,

https://proceedings-paris2007.piarc.org/ressources/files/3/AP01-ROGINSKI-E.pdf

- High Tire Pressure tests conducted at FAA NAPTF, 2007 and 2009 (heated).
- Pavement Experimental Programme (PEP) tests by Airbus at Toulouse (2009 – 2010)







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High Tire Pressure Full Scale Tests

• Test results from NAPTF HTP tests concluded that:

"Increasing tire pressure from 210 psi (1.45 MPa) to 245 psi (1.66 MPa) had an insignificant effect on the amount of rutting caused by trafficking at two different wheel loads on two different asphalt mixes, one straight asphalt and the other polymer modified."

I. Song, "Full-Scale High Tire Pressure Tests on Heated Pavement," Report to ICAO AOSWG, 2010.

- Airbus PEP came to a similar conclusion.
- Annex 14 amendment revising tire pressure code limits was applicable in November 2012.



Figure 9. Rut depth changes with different tire pressures and load magnitudes in the PG 76-22 test items.

ACR/PCR Topics





Overlay PCR Example



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Overlay PCR Example

- Like ACN/PCN, the ACR/PCR system does not recognize "composite" or overlay pavements for reporting purposes.
- Pavements are categorized as either flexible (F) or rigid (R).
- The general rule is, report the type that most accurately reflects the structural behavior of the pavement.
 - Pavement type does not necessarily correspond to the wearing surface material.
 - FAARFIELD will consider a rigid pavement overlaid with asphalt to be type "R" if the overlay thickness < the PCC thickness.
 - If the overlay thickness matches or excess the PCC thickness, FAARFIELD determines the correct type (R or F) based on life computation.



Overlay PCR Example

- Medium-hub airport in the U.S.
- Runway 9-27 is 2,896 m (9,500 ft.) long and 46 m (150 ft.) wide.
 - The surface is HMA, except for a 1352-m (155-foot) length at the intersection with a crossing runway, which is PCC.
 - Runway was constructed in 1968 as a PCC pavement. At the time of initial construction, the PCC section was 25.4 cm (10 in.), except for 152-m (500-ft.) long sections at each runway end, where the PCC thickness was increased to 30.5 m (12 in.).
 - Subsequent overlays in 1981, 1997 and 2012 increased the total HMA thickness to approximately 25,4 m (10 inches).
- The PCN for this composite pavement is reported on the AMR as 65/F/D/W/T.



	Obstruction Data	
09/27	FAR 77 Category	PIR/I
9,501	Displaced Threshold	
150	Controlling Obstruction	
ASPH-G	Obstruction Marked/Lighted	
GRVD	Height Above Runway End	
	Distance From Runway End	
75.0	Centerline Offset & Direction	
125.0	Obstruction Clearance Slope	50
180.0	Close-In Obstruction	1
(2D/2D2) 260.0		
65 /F/D/W/T		
	09/27 9,501 150 ASPH-G GRVD 75.0 125.0 180.0 (2D/2D2) 260.0 65 /F/D/W/T	09/27 FAR 77 Category 9,501 Displaced Threshold 150 Controlling Obstruction ASPH-C Obstruction Marked/Lighted GRVD Height Above Runway End Distance From Runway End 750 Centerline Offset & Direction 1250 Obstruction Clearance Slope 180.0 Cleare-In Obstruction 260.0 65/F/D/W/T

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Federal Aviation Administration

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Overlay PCR Example – Input Data

Design Aircraft Traffic

No.	Aircraft		Departures
1	A300-600 Std Bogie	380,518	18
2	A318-100 opt	141,978	553
3	A320-200 std	150,796	170
4	A321-100 std	183,866	28
5	B717-200 HGW	122,000	111
6	B727-200 Advanced Basic	185,200	5
7	B737-300	140,000	651
8	B737-700	155,000	2000
9	B737-800	174,700	235
10	B737-900 ER	188,200	53
11	B757-200	256,000	137
12	B767-400 ER	451,000	4
13	B787-9	555,000	4
14	CRJ100/200	47,450	102
15	CRJ700	72,500	473
16	DC/MD-10-10/10F	458,000	10
17	DC9-32	109,000	9
18	Q400/Dash 8 Series 400	64,700	122
19	ERJ-145 ER	45,635	143
20	ERJ-145 XR	53,352	187
21	EMB-170 STD	79,697	864
22	EMB-190 STD	105,712	11
23	MD-11	633,000	17
24	MD-83	161,000	209
25	MD-90-30 ER	168,500	235

FAARFIELD Representation of Evaluation Structure



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Overlay PCR Example – FAARFIELD 2.0

	D 2.0.18 (Build 05/26/2022) b Open Job Hew Section Save Job Save As Save All X Close Job User Defined Aircraft 🛨 Create 1 Section	Edit Batch Run Selection	
	Traffic		Calculate HMA CDF: No
(SCI 67) represents the assumed poor condition of existing PCC	Section Job Name: PCR Comparisons 2 PCR Run Section Name: Airport F RWY 9-27 Include in Summary Report Add To Batch Pavement Layers Pavement Type: HMA on Rigid Material Thickness (mm) E (MPa) k (MN/m^3) R (MPa) IP-401/P-403 HMA Overlay 254 1.378.95 S01 PCC Surface 254 27.579.04 4.48 VP-403 HMA Stabilized 152 2.757.90 P-1 crushed Aggregate 102 77.70 Subgran 51.71 27.3	•tus Gear Structure •401/P-403 HMA Overlay T=254 mm E=1,378.95 MP •501 PCC Surface • T=254 mm R=4.48 MPa	Automatic flexible base design: Output file: Units: Metric Allow Flexible Computation for Thick Veriays on PCC Compute ACR for All Subgrade Categories Show Advanced Options
	Select As The Design Layer Delete Selected Layer Design Life (Years): 20 SCI: 67 Percent CDFU: 100 P/TC Ratio: 1 The standard design life for pavement section is 20 years (1 to 50 allowed). Results Calculated Life (Years): Total thickness to the top of the subgrade: 762 mm	-401/P-403 HMA Stabilized T=152 mm E=2,757.90 MP -154 Uncrushed Aggregate F=102 mm E=77.70 MPa ubgrade E=51.71 MPa Copy Structure to Clipboard	a Set as Program Default Reset Default to Initial Show/Hide Pavement Image Change Pavement Image Change Pavement Graphics User Defined Aircraft Directory: C:\Users\David Brill\Documents ▼ Design Options Notes

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Overlay PCR Example – FAARFIELD 2.0

- FAARFIELD computes PCR <u>3650/F/D</u>.
- No operating weight restrictions
- Since the overlay thickness matches that of the existing PCC, FAARFIELD can compute flexible PCR, by converting the PCC to a high-stiffness user-defined layer.



Open Job (+) New Section	Save Job P Save As	Save All X Close Job	User Defined Aircraft 🛛 🖶 C	reate 🕈 Edit Batch Run	Selection Select All	DeSelect All	ess	(2) Help	Rese
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Section							V X	Calculate HMA CDF:	No
Jah Nama		PCP		Status Goar St	ructure			Automatic Bauilda	
JOD Name: PCR Com	iparisons 2	T CK	* Kun	Dep c L L L	idetale .			base design:	Yes
Section Name: Airport F	RWY 9-27	 Include in Summary 	Report Add To Bato	Run Time: 650	seconds			-	
Pavement Lavers				PCR = 3645/F/I	D/X/T			Output file:	No
Pavement Type: H	MA on Rigid	~							
					L			Units: Metric	
Material	Thick	ness (mm) E (MPa)	k (MN/m^3) R (MPa					Allow Flexible	
> P-401/P-403 HMA	Overlay 254	1,378.95						Computation for Thick	Yes
P-501 PCC Surface	254	27,579.04	4.48	Status	Gear	Structure		Overlays on PCC	
P-401/P-403 HMA	Stabilized 152	2,757.90		Status	Gear	Structure		Compute ACR for All	No
P-154 Uncrushed A	ggregate 102	77.70						Subgrade Categories	
Subgrade		51.71	27.3						
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◀ Traffic							• 	Aircraft\	Director
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Overlay PCR Example – FAARFIELD 2.0

- Alternatively, if the flexible option is disabled, then FAARFIELD computes PCR <u>770/R/D</u>.
- Does not take advantage of the available strength by treating pavement as a flexible structure.
- Much lower rigid PCR would require operating weight restrictions on several mix aircraft.



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					Run Time: 716 : PCP - 770/P/D	econds				Outout file:	No
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P-401/P-403 HM	A Overlay 254		1 378 95	(MP		1				Allow Flexible Computation for Thick	No
P-501 PCC Surfac	e 254		27 579 04	4.48	C1 1	-	C 1 1			Overlays on PCC	
P-401/P-403 HM	A Stabilized 152		2,757.90	4.40	Status	Gear	Structure	2		Compute ACR for All	Ma
P-154 Uncrushed	Aggregate 102		77.70							Subgrade Categories	INO
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9 February 2024

ACR/PCR Topics



Using Aircraft PCR Example



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ACR/PCR Topics



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Using Aircraft PCR Determination

- Method based on experience with "using aircraft"
 - Limited knowledge of the existing traffic and runway characteristics
 - Considered when technical evaluation is not economical or feasible
- A pavement satisfactorily support aircraft using it, can accept other aircraft if they are no more demanding than the using aircraft.
- Inaccuracies:
 - Accuracy depends on having records of past aircraft traffic
 - Significant over-estimation of the pavement capacity can result if an excessively damaging aircraft, which uses the pavement infrequently, is used to determine PCR.
 - Significant underestimation of the pavement capacity can lead to uneconomic use of the pavement by preventing acceptable traffic
- Airport authorities should exercise more care when applying a Using Aircraft PCR than they would with a Technical PCR.



ACR/PCR Topics



Using Aircraft Evaluation Process

Basic Process

- Identify the pavement type of- Flexible or Rigid
 - Will have to consider both ACR's if runway include both pavement types
- Determine the subgrade category of the pavement
 - Use available data to establish subgrade strength
 - Use subgrade category **C** if no information is available
- Determine the ACR for each aircraft in the traffic mix using the pavement
 - The FAA recommends that an aircraft be considered to "regularly use" an airport if they have 250 annual departures. Use engineering judgement for seasonal or occasional use aircraft
- Assign the highest ACR value as the PCR
 - Consider adjustments based on local experience & condition
- Monitor pavement performance



ACR/PCR Topics



ACR Determination

- The Aircraft Manufacturer provides the official computation of ACR values for an aircraft type
 - Boeing and Airbus are updating their aircraft characteristics documents and software to incorporate ACR curves
- Computation of ACR requires detailed information on the operational characteristics of the aircraft such as center of gravity, weight, wheel spacing and tire pressure
- Each aircraft will report 8 ACRs at a give operational load
 - 4 flexible, one for each subgrade category
 - 4 rigid, one for each subgrade category
- ICAO ACR has been developed as software to computer ACRs for aircraft based on manufacturer data.



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Manufacturer ACR Data

787 Airplane Characteristics for Airport Planning

DOCUMENT NUMBER: D6-58333					0N: O		REVISIO Februa	on date ary 202	23			
		PAVE	ACR FO	R RIGI SUBGR	D ADES	AC PAVE	R FOR	FLEXII	BLE RADES]		
AIRCRAFT TYPE	MAXIMUM TAXI WEIGHT MINIMUM WEIGHT *[1] LB (KG)	LOAD ON ONE MAIN GEAR LEG (%)	TIRE PRESSURE PSI (MPa)	НІ G Н E = 200 МРа	MEDIUM E = 120 MPa	LOW E = 80 MPa	ULTRA LOW E = 50 MPa	HIGH E = 200 MPa	MEDIUM E = 120 MPa	LOW E = 80 MPa	ULTRA LOW E = 50 MPa	SIFICATION RATING (ACR)
787-8	503,500 (228,383) 250,000 (113,398)	45.64	228 (1.57)	670 270	790 290	870 320	970 360	550 270	590 270	690 280	910 310	FT CLASS
797-0	563,000 (255,373)	46.11	229 (1 58)	740	860	960	1070	620	660	750	970	IRCRA
/0/-9	250,000 (113,398)	40.11	229 (1.56)	260	280	310	340	270	270	280	290] <
797-10	561,500 (254,692)	46.63	224 (1.54)	740	870	970	1080	620	660	760	990	
107-10	250,000 (113,398)	40.03	224 (1.54)	260	280	310	350	270	270	280	300	

*[1] Minimum weight used solely as a baseline for ACR curve generation.

•787-8 ACR Example= 680/F/C



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ACR/PCR Topics



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ICAO-ACR Determination

- FAA Developed Program
- Calculates standard ACRs for aircraft
 - Remember Manufacturer Data is official
- Core library can be linked to other programs that compute PCR
- Backbone of FAARFIELD 2.0 PCR Module

Pav Gross F Numb	ement Type Weight (bs) Percent GW er of Wheels	Rexible Rigid 503,50 0.456	0	Selec	t Airplane Group Boeing t Airplane B787-8 Calculate	ACR *	
Tire P	ressure (psi) Wheel (228.0	0	Display Sele	ct Wheels (SW)	Metric	
No	X	Y	^	Subgrade	Subgrade Modulus	Rigid	ACR Thickness t
1	-25.50	0.00		Category	[DSI]	ACR Number	[in]
2	25.50	0.00		C	11 602 02	972 67	17.59
3	-25.50	57.50		B	17,003.02	784.86	16.05
4	25.50	57.50		Δ	29.007.55	674.13	14.09
		_	~	~	20,007.00	0,4.10	14.00
ut Dat Percei imber o ie Pres	a - Gear 2 nt GW 2 of Wheels 2 sure 2 (psi)			Calculat	ion time: 0.66 sec.		
	Wheel Coo	rdinates (in)					
No	X	Y					

http://www.airporttech.tc.faa.gov/Products/Airport-Pavement-Software-Programs/Airport-Software-Detail/ArtMID/3708/ArticleID/2838/ICAO-ACR-13

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ACR/PCR Topics



- Muñiz airport has an asphalt runway with the known traffic mix ulletshown in below pavement with an estimated
- Subgrade strength is Unkown

No.	Aircraft Name	Gross Weight, lbs.	Annual Departures	Tire Pressure, psi
1	A300-B4 Std	365,747	1,500	216.1
2	A319-100 Std	141,978	1,200	172.6
4	B737-300	140,000	6,000	201.0
5	B747-400	877,000	1,000	200.0
6	B767-200 ER	396,000	2,000	190.0
7	B777-200 ER	657,000	1,000	205.0
8	DC8-63	330,000	3,000	194.0

Flexible

Process

•Pavement type F or R Subgrade Category •ACR for each aircraft Determine highest ACR •Report PCR Monitor pavement performance

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ACR/PCR Topics



Determine Subgrade Category

No information available

	Subgrade Strength Category	Subgrade Support E (Elastic Modulus) psi (MPa)	Represents E (Elastic Modulus) psi (MPa)	Code Designation	
	High	29008 (200)	$E \ge 21,756$ (≥ 150)	А	
	Medium	17405 (120)	E ≥14,504 <21,756 (≥100 <150)	В	
<	Low	11603 (80)	E≥8,702 <14,504 (≥60 <100)	С	Þ
	Ultra Low	7252 (50)	E < 8,702 (< 60)	D	

Table 2-1. Standard Subgrade Conditions for ACR Calculation

Process •Pavement type F or R •Subgrade Category •ACR for each aircraft •Determine highest ACR •Report PCR •Monitor pavement performance

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ACR/PCR Topics



• Determine the ACR for each aircraft

- What resources can I use?

No.	Aircraft Name	Gross Weight, lbs.	Annual Departures	Tire Pressure, psi
1	A300-B4 Std	365,747	1,500	216.1
2	A319-100 Std	141,978	1,200	172.6
4	B737-300	140,000	6,000	201.0
5	B747-400	877,000	1,000	200.0
6	B767-200 ER	396,000	2,000	190.0
7	B777-200 ER	657,000	1,000	205.0
8	DC8-63	330,000	3,000	194.0

Process •Pavement type F or R •Subgrade Category •ACR for each aircraft •Determine highest ACR •Report PCR

•Monitor pavement performance

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Utilize ICAO-ACR Software

No.	Aircraft Name	Gross weight Kg	Annual Departures	ACR (Flex-C)
1	A300-B4 Std	166049	1500	
2	A319-100 Std	64458	1200	
4	B737-300	63560	6000	
5	B747-400	398158	1000	
6	B767-200 ER	179784	2000	
7	B777-200 ER	298278	1000	
8	DC8-63	149820	3000	

Process

Pavement type F or R
Subgrade Category
ACR for each aircraft
Determine highest ACR
Report PCR

•Monitor pavement performance



Determine the highest ACR

No.	Aircraft Name	Gross weight Kg	Annual Departures	ACR (Flex-C)
1	A300-B4 Std	166049	1500	548
2	A319-100 Std	64458	1200	326
4	B737-300	63560	6000	346
5	B747-400	398158	1000	607
6	B767-200 ER	179784	2000	508
7	B777-200 ER	298278	1000	587
8	DC8-63	149820	3000	523

Process

 Pavement type F or R
 Subgrade Category
 ACR for each aircraft
 Determine highest ACR
 Report PCR
 Monitor pavement performance

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ACR/PCR Topics



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- Reporting the PCR
 - Flexible Pavement
 - Subgrade C
 - Highest ACR of Traffic Mix 607

Recommended Runway PCR

610/F/C/X/U

• Actively monitor pavement performance!!!

Process

Pavement type F or R
Subgrade Category
ACR for each aircraft
Determine highest ACR
Report PCR
Monitor pavement

•Monitor pavement performance

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ACR/PCR Topics



Questions?



ACR/PCR Topics



Resources-Videos

1.



FAARFIELD Training Video Series

by Federal Aviation Administration Plavlist • 9 videos • 239 views

The FAARFIELD training video series is a guide for new users learning the FAARFIELD software. It encomps...more

 \square

Play all

- FAARFIELD Overview (8:45)
- 2. Quick Start Pavement Design (10:32)
- 3. User Defined Aircraft (9:55)
- 4. Flexible Pavement Design, Part 1, Flexible GA (7:59)
- 5. Flexible Pavement Design, Part 2< Modified Subgrade (6:57)
- 6. Rigid Pavement Design (6:35)
- 7. Flexible Overlays (12:06)
- 8. Rigid Overlays (6:20)
- 9. Pavement Classification Rating (13:59)





Resources-Videos

• AC 150/5335-5D

ACR/PCR Topics



Open Discussion

ACR/PCR Topics



Determine the highest ACR for Rigid Section

No.	Aircraft Name	Gross weight Kg	Annual Departures	ACR (Flex-C)	ACR (Rigid-C)
1	A300-B4 Std	166049	1500	548	667
2	A319-100 Std	64458	1200	326	396
4	B737-300	63560	6000	346	416
5	B747-400	398158	1000	607	767
6	B767-200 ER	179784	2000	508	635
7	B777-200 ER	298278	1000	587	885
8	DC8-63	149820	3000	523	693

Process

Pavement type F or R
Subgrade Category
ACR for each aircraft
Determine highest ACR
Report PCR
Monitor pavement

performance

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