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PCN–PCR Comparisons for Medium- and Large-Hub Airport Runways

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16. Abstract

The Aircraft Classification Rating/Pavement Classification Rating (ACR/PCR) system was introduced in 2020 by the International Civil Aviation Organization (ICAO) as the standard method for reporting airport pavement bearing strength, replacing the previous Aircraft Classification Number/Pavement Classification Number (ACN/PCN) system. The Federal Aviation Administration (FAA) compared Pavement Classification Numbers (PCN) and Pavement Classification Ratings (PCR) for a selection of runways at large- and medium-hub airports for which as-built structural data and design traffic are available. Both flexible (asphalt-surfaced) and rigid (concrete-surfaced) runway pavements were included. PCN was computed using the method of FAA Advisory Circular (AC) 150/5335-6C, while PCR used the method of AC 150/5335-6D and the computer program FAARFIELD 2.0. In contrast to the AC 150/5335-5C method, FAARFIELD 2.0 implements an algorithm that produces a single PCR number based on a defined critical aircraft from the input traffic mixture. The comparisons demonstrate that the two systems (ACR/PCR and ACN/PCN), if used correctly, result in similar restrictions on using aircraft traffic.

This report includes a brief summary of ACR/PCR concepts and a description of the PCR computation method as implemented in FAARFIELD 2.0.

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LIST OF ACRONYMS

AC	Advisory Circular
ACN	Aircraft Classification Number
ACR	Aircraft Classification Rating
ADM	Aerodrome Design Manual
AIP	Airport Improvement Program
AMR	Airport Master Record
ATPB	Asphalt-Treated Permeable Base
CBR	California Bearing Ratio
CDF	Cumulative damage factor
DSWL	Derived single wheel load
EAPL	Extended Airport Pavement Life
FAA	Federal Aviation Administration
FAARFIELD	FAA Rigid and Flexible Iterative Elastic Layered Design
GW	Gross weight
HMA	Hot-mix asphalt
HWD	Heavy-weight deflectometer
ICAO	International Civil Aviation Organization
LEA	Layered elastic analysis
MAGW	Maximum allowable gross weight
PCC	Portland cement concrete
PCN	Pavement Classification Number
PCR	Pavement Classification Rating
pci	pounds per cubic inch
psi	pounds per square inch
SCI	Structural Condition Index

EXECUTIVE SUMMARY

In April 2022, The Federal Aviation Administration (FAA) released an update to Advisory Circular (AC) 150/5335-5, *Standardized Method of Reporting Airport Pavement Strength – PCR*. The updated document mandates the use of the Aircraft Classification Rating/Pavement Classification Rating (ACR/PCR) system, which was adopted in 2020 by the International Civil Aviation Organization (ICAO) with an effective date of July 20, 2020. The ACR/PCR system will be fully applicable in November 2024 and replaces the previous standard Aircraft Classification Number/Pavement Classification Number (ACN/PCN) system. The new FAA guidance requires the use of the FAA computer program FAARFIELD, version 2.0 or higher, to compute PCR.

This report includes a brief summary of ACR/PCR concepts and major differences from the previous ACN/PCN system. One key difference is a change in definition of the derived single wheel load (DSWL) that increases the scale of ACR/PCR values by one order of magnitude relative to the equivalent ACN/PCN values. Due to the very different engineering models underlying the ACN/PCN and ACR/PCR systems, there is no ability to convert directly from PCN to PCR for any given case. Rather, it is important to compute PCR separately using the given computational procedure, even if one has previously computed PCN for the same structure and traffic. Due to the simplicity of the FAARFIELD PCR procedure, this is not a difficult requirement, and if the data are available that were used to develop the previous PCN computation, then computing PCR using FAARFIELD is straightforward. A second key difference is that the new method using FAARFIELD always results in a single PCR value based on a critical aircraft determined by the algorithm. This is in contrast to the previous method of AC 150/5335-5C, which provided a range of possible PCN values depending on the user's selection of critical aircraft. Thus, the new procedure removes some of the inherent ambiguity of the older method.

This report includes detailed, step-by-step comparisons of PCR computations using FAARFIELD, version 2.0, following the procedure outlined in AC 150/5335-5D, with the equivalent PCN computations using the method of cancelled AC 150/5335-5C and the COMFAA 3.0 computer program. All examples are taken from actual airports where the evaluation structures and traffic data were available. Where applicable, the PCN values determined from COMFAA 3.0 were compared with the actual PCN values reported in the Airport Master Record (AMR). Both flexible (asphalt-surfaced) and rigid (concrete-surfaced) runway pavements were evaluated. The comparisons demonstrate that (a) the FAARFIELD program is generally more robust than COMFAA (particularly for very strong flexible structures for which FAARFIELD gave valid PCR data while COMFAA returned exceptions); and (b) the two systems (ACR/PCR and ACN/PCN), if used correctly, result in similar restrictions on using aircraft traffic.

1. INTRODUCTION

The International Civil Aviation Organization (ICAO) has adopted a method to replace the legacy Aircraft Classification Number/Pavement Classification Number (ACN/PCN) method. The new method, designated Aircraft Classification Rating/Pavement Classification Rating (ACR/PCR), is incorporated in Amendment 15 to ICAO Annex 14, Volume 1 (ICAO, 2020), and elaborated in a forthcoming update to the ICAO Aerodrome Design Manual (ADM) Part 3 (ICAO, 2022). The ACR/PCR method became effective in July 2020, and is expected to fully replace ACN/PCN by 2024. During the transition period, both methods will remain available.

PCR reporting is the responsibility of airports. In the United States, the Federal Aviation Administration (FAA) supports the ACR/PCR method by requiring all public use airports that receive Airport Improvement Program (AIP) grants or other Federal funding to report PCR data on the Airport Master Record (AMR). Advisory Circular (AC) 150/5320-5D, *Standardized Method of Reporting Airport Pavement Strength – PCR* (FAA, 2022), provides guidance and procedures for determining PCR using the FAA computer program FAARFIELD 2.0 (FAA, 2021a). The new procedures supersede those in cancelled AC 150/5320-5C (FAA, 2014), which covered PCN.

This report aims to give a selection of real-world examples of PCR calculations on large- and medium-hub airport runways using FAARFIELD 2.0 and to compare with the previous PCN method. The results show that the methods are comparable, and that the PCR method is more robust, returning valid PCR values where the older PCN method (based on FAA program COMFAA 3.0) either failed or returned unusable data.

2. ACR/PCR CONCEPTS

The ACR/PCR procedures are covered in detail elsewhere (ICAO, 2022; FAA, 2022) and will not be repeated here. However, a brief summary of key ACR/PCR concepts is necessary for a proper understanding of what follows. The ACR/PCR system preserves the structure and reporting format of ACN/PCN but changes the underlying calculation procedure. Figure 1 illustrates the basic concept of ACR computation, in which the thickness requirement (t) for an evaluation aircraft is equated to the thickness requirement for a standard single wheel load. The magnitude of the single wheel load is the unknown quantity whose value is sought, and is, therefore, referred to as the mathematically derived single wheel load (DSWL). ACR is proportional to DSWL. From Figure 1, the overall similarities to ACN computation are clear. The key changes from the ACN method are as follows:

- All structural computations (for both flexible and rigid pavements) use layered elastic analysis (LEA), instead of the California Bearing Ratio (CBR) method (for flexible pavements) or Westergaard's formulas (for rigid pavements). The method defines standard LEA structures that must be used for the computation. A range of empirical adjustment factors (i.e., load repetition (alpha) factor, layer equivalency factor, top-of-base k-factor), previously used in the standard ACN/PCN method, are not required in ACR/PCR due to the change to LEA-based computations.

- The ACR/PCR system retains the four standard subgrade categories (A, B, C, D), but the categories are defined by limits on the subgrade elastic modulus E, rather than on subgrade CBR (flexible) or top-of-base k-value (rigid). The same categories now apply to flexible and rigid pavements.

- The procedure for computing flexible ACR has been changed so that it captures the strain contribution of all wheels in a main landing gear. By contrast, the ACN procedure considers only a single truck of multiple-truck main landing gears (such as the Boeing B747 gear) as contributing to ACN.
- The standard tire pressure has been increased to 1.5 MPa from 1.25 MPa.

- The standard number of coverages for flexible ACR computations has been increased to 36,500 from 10,000.

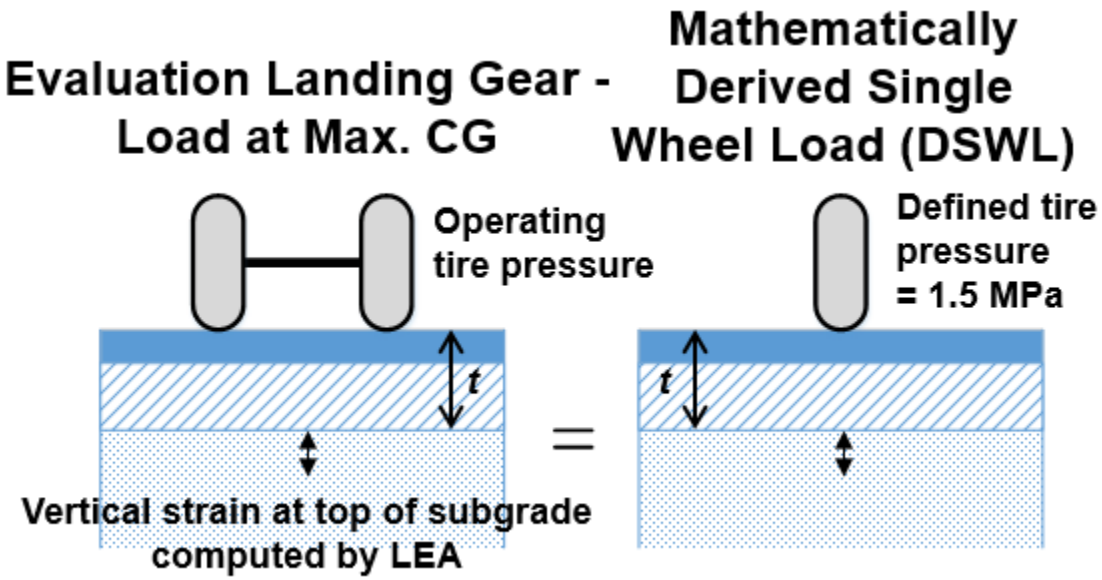


Figure 1. ACR Computational Scheme

ACR is defined as two times the DSWL expressed in hundreds of kilograms, rather than in thousands of kilograms as in the definition of ACN. This change in definition has the effect of making the ACR value (and associated PCR value) approximately ten times higher in magnitude than the ACN value (and associated PCN). This is strictly a matter of definition; it does not mean that one can convert ACN to ACR (or PCN to PCR) by multiplying by ten. The reason for making this change was to prevent the possibility of confusion in reporting (e.g., by accidentally comparing ACR to PCN), especially during the transitional period when both systems are in use.

The PCR is defined as the ACR of a "critical" or reference aircraft at its maximum allowable gross weight (MAGW). Thus, the essential function of a PCR method is to identify the critical aircraft and to determine the MAGW. At that point, the ACR can be calculated using the standard ICAO procedure and assigned to the PCR. The specific algorithm for computing PCR in the FAA method is discussed in the following section.

3. PAVEMENT CLASSIFICATION RATING (PCR) METHOD

The following comparisons are between the PCN evaluation method in AC 150/5335-5C and the new PCR approach in AC 150/5320-5D. As implemented in FAARFIELD 2.0, PCR is based on a critical aircraft taken from the traffic list and uniquely determined by algorithm. This is in contrast to the COMFAA method, which does not designate a specific critical aircraft, but treats each aircraft in the list in turn as the critical aircraft, leaving the final selection of the PCN to the engineer. The steps in the FAARFIELD implementation of PCR are as follows:

1. Compute the ACR of each aircraft in the traffic list at its operating weight. Identify the aircraft with at least 10 annual departures in the traffic list that has the maximum ACR at its operating weight.
2. Select the critical (or reference) aircraft for PCR computations. The critical aircraft is defined as the aircraft in the FAARFIELD traffic list that makes the highest contribution to the critical Cumulative Damage Factor (CDF) (i.e., the highest contributor to the CDF evaluated on the strip at the critical offset).
3. The number of equivalent departures of the critical aircraft, for PCR computations, is defined as the number of departures of the critical aircraft at operating weight that produces the critical CDF (i.e., without considering the contributions of any other aircraft in the mix).
4. The MAGW of the critical aircraft is defined as the gross weight (GW) of the aircraft for which the number of equivalent annual departures produces a CDF equal to 1.0.
5. Determine the ACR of the critical aircraft at the MAGW.
6. Check whether the critical aircraft is the maximum ACR aircraft identified in step 1. If so, skip to step 8.
7. Eliminate the critical aircraft from the traffic list. Repeat steps 2 through 6 using the reduced traffic list, applying the same definitions in 2 through 4 to the reduced traffic list. The critical CDF for the reduced list is the same as computed for the original list.
8. The PCR is the maximum value of ACR computed in step 5.

A flowchart of the above process is shown in Figure 2. The purpose of additional step 7 is to account for certain cases with large numbers of annual departures of a short-/medium-range aircraft (such as the B737) and a relatively small number of departures of a long-range aircraft (e.g., the B777). Without this step, the smaller aircraft would generally be critical, with the result that PCR would require unreasonable operating weight restrictions on larger aircraft (unreasonable because the design traffic already included the large aircraft). Note that if the initial critical aircraft is also the aircraft in the list with the highest ACR at operating weight, then the above procedure is completed in one iteration, with no reduction to the traffic list.

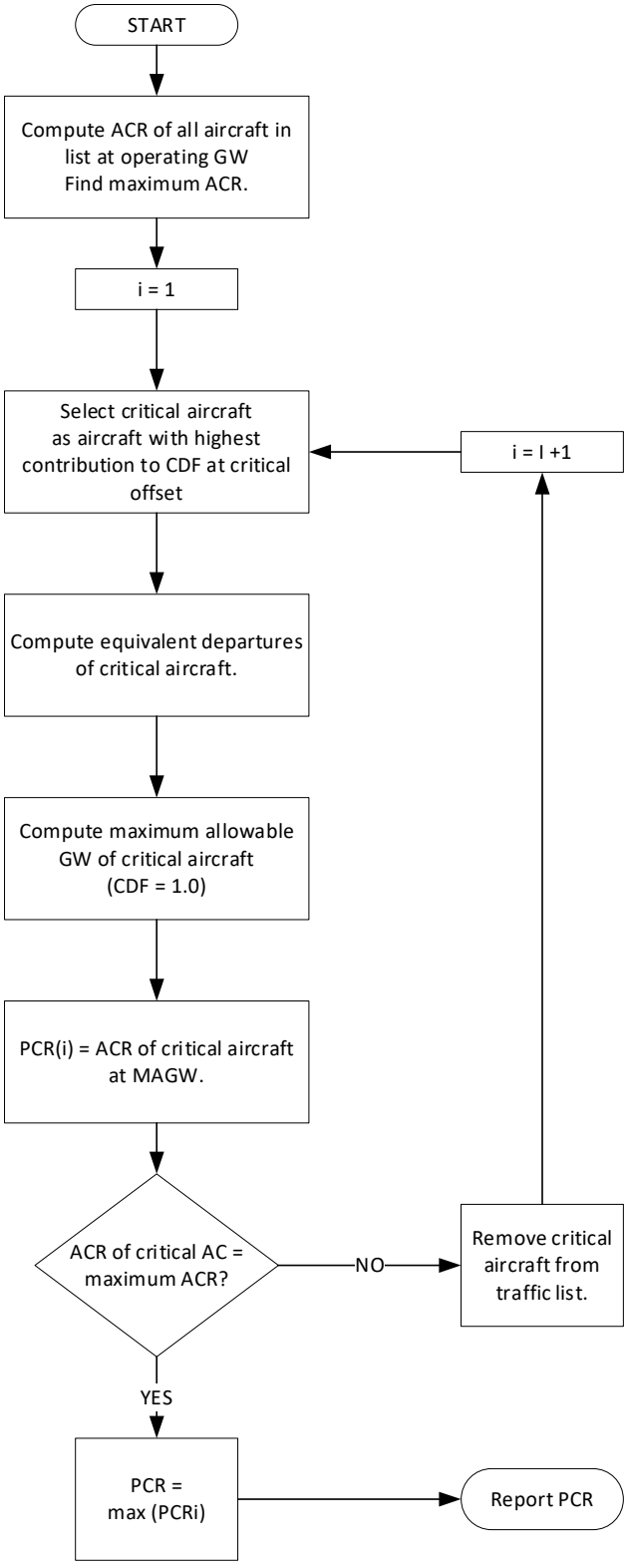


Figure 2. Flowchart of FAARFIELD PCR Procedure

The procedure shown in Figure 2 returns a uniquely determined PCR numerical value based on the identified critical aircraft. The application of the procedure is illustrated with the following example, using the traffic list in Table 1. While the example involves only six aircraft types, it is nevertheless complicated by high levels of traffic for medium-range aircraft (B737 and Airbus A320) and relatively fewer departures of several long-range/heavy aircraft types (A330, B777, and A380).

Table 1. Example Traffic Mix

No.	Aircraft	Gross Weight (lb)	Gross Weight (tonnes)	Annual Departures
1	A330-300 WV022	515,650	233.9	52
2	B777-300ER	777,000	352.4	52
3	A380-800 WV002	1,258,850	571.0	52
4	B737-900 ER	188,200	85.4	10,950
5	A320-200 opt	172,850	78.4	10,950
6	A321-200 opt	207,025	93.9	1,560

Assuming a CBR 19 (196.5 MPa) subgrade, FAARFIELD 2.0 produces the following design for a 20-year life:

- P-401 Hot-Mix Asphalt (HMA) Surface, 4 in. (102 cm)
- P-403 HMA Base, 5 in. (127 cm)
- P-209 Crushed Aggregate High-Quality Subbase, 7.0 in. (179 cm)
- (16 in.-/ 407-mm total thickness on subgrade category A)

Table 2 gives the ACR values at operating weight of the mix aircraft on subgrade category A. Note that the aircraft with the maximum operating weight ACR in the design mix is the B777-300 ER (ACR 574.6/F/A). In Table 2, the percentages of aircraft gross weight on the main gear are those associated with the critical aft center of gravity for ACR computation and differ from the value (95%) used for thickness design. Likewise, the tire pressures in Table 2 are fixed values assigned for ACR computation.

Table 2. Flexible ACR of Traffic Mix Aircraft in Example (Data from FAARFIELD 2.0 PCR Report Results Table 3)

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure, (psi)	ACR Thickness, (in.) (A)	ACR/F/A
1	A330-300 WV022	515,650	95.70	206.0	19.8	570.4
2	B777-300 ER	777,000	92.46	218.0	19.9	574.6
3	A380-800 WV002	1,258,850	95.05	203.0	19.7	566.0
4	B737-900 ER	188,200	94.58	220.0	17.4	422.9
5	A320-200 opt	172,850	92.80	209.0	16.3	368.0
6	A321-200 opt	207,025	94.60	217.6	18.1	462.0

psi = pounds per square inch

Figure 3 shows the distribution of CDF using the ACR/PCR aircraft gear characteristics. As shown in Figure 3, the maximum CDF offset is at 150 in. from the centerline, and the highest contribution to the maximum CDF is from the B737-900 aircraft. Thus, the B737-900 becomes the critical aircraft in the first iteration.

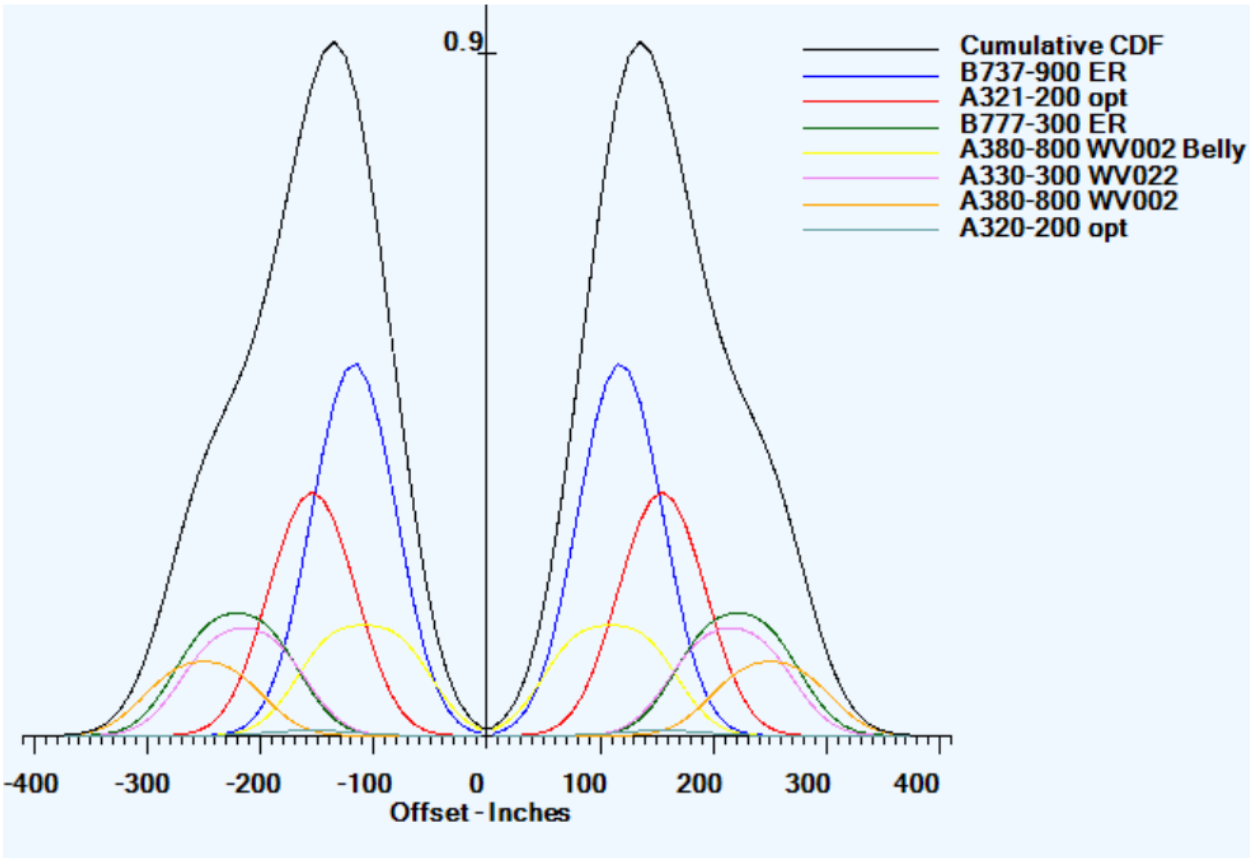


Figure 3. FAARFIELD 2.0 CDF Distribution in Example Problem

To compute PCR following the flowchart in Figure 1, FAARFIELD executes the sequence of steps in Table 3.

Table 3. Steps in FAARFIELD Determination of PCR in Example Problem

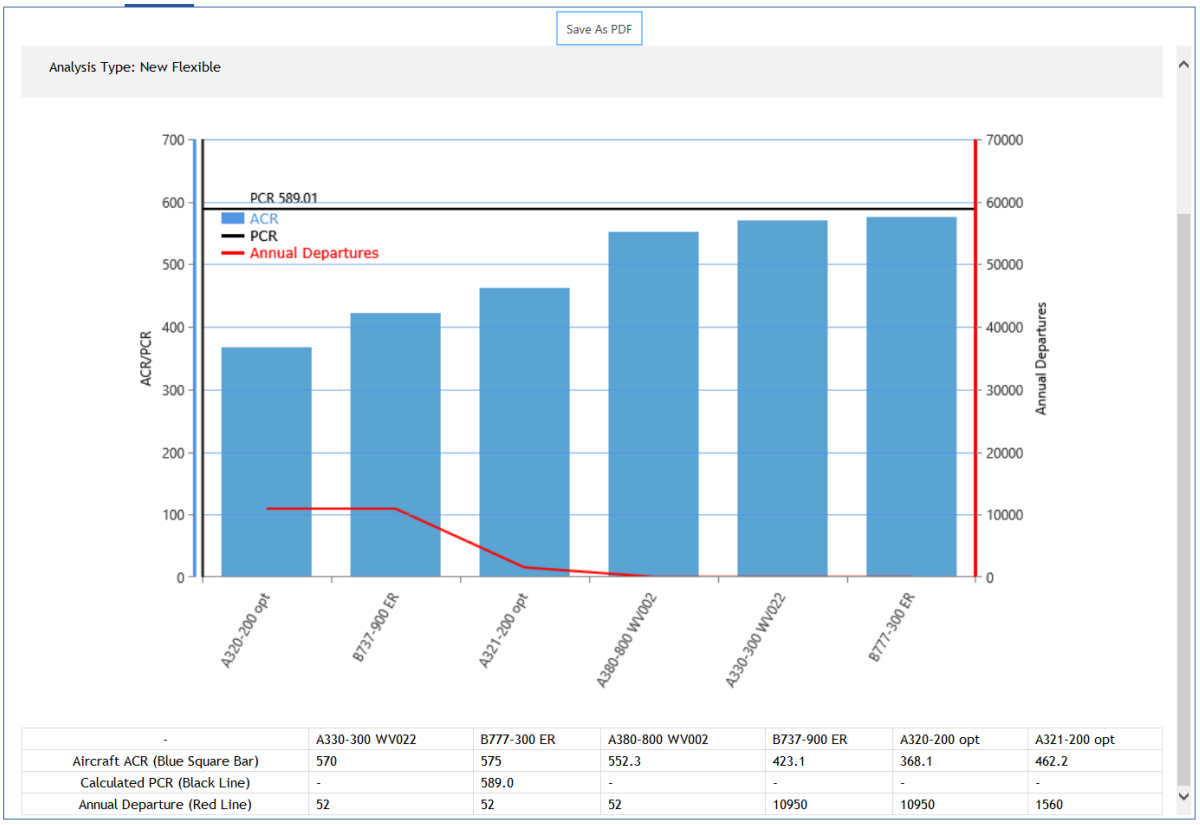
Iteration No.	Critical Aircraft	Equivalent Departures of Critical Aircraft	MAGW of Critical Aircraft, (lb)	ACR Thickness (in.)	ACR/F/A	Critical Aircraft is Maximum ACR Aircraft?
1	B737-900 ER	20,234	188,534	17.41	423.7	No
2	A321-200 opt	4,467	207,516	18.17	463.2	No
3	B777-300 ER	300	779,763	19.91	576.8	Yes

Iteration No. 1. From Table 2, the B737-900 is not the aircraft with the maximum operating weight ACR in the design mix. Thus, the next step in the procedure is to apply the first-level reduction

and remove the critical B737-900 from the mix. The critical aircraft for the remaining traffic is the A321-200.

Iteration No. 2. Again, the A321-200 is not the aircraft with the maximum operating weight ACR in the design mix. Therefore, the procedure applies a second-level reduction to the list, which removes both the B737-900 and the A321-200. After the second-level reduction, the critical aircraft is the B777-300 ER.

Iteration No. 3. As indicated in Table 3, the B777-300 ER is the aircraft with the maximum operating weight ACR in the design mix. This is the stopping criterion for the iterations. Therefore, jump to step 8 and compare the ACR values computed for all three iterations. The program automatically selects the largest ACR value and reports PCR 577/F/A for the example, based on the B777-300 ER as critical. Figure 4 shows the FAARFIELD 2.0 graphical output. Note that reporting either of the first two values (based on the B737-900 or A321-200) would have imposed severe operating weight restrictions on most aircraft in the design mix, which is not acceptable. Since the PCR is based on the B777 as critical aircraft, it requires no weight restrictions and is consistent with the thickness design.



-	A330-300 WV022	B777-300 ER	A380-800 WV002	B737-900 ER	A320-200 opt	A321-200 opt
Aircraft ACR (Blue Square Bar)	570	575	552.3	423.1	368.1	462.2
Calculated PCR (Black Line)	-	589.0	-	-	-	-
Annual Departure (Red Line)	52	52	52	10950	10950	1560

Figure 4. FAARFIELD 2.0 Graphical PCR Output for Example

In Figure 4, all mix aircraft had non-negligible contributions to the total CDF. However, this is not always the case, particularly when there is a mix of large and small aircraft. In the FAARFIELD failure model, extremely small CDF contributions from light aircraft correspond to extremely long

theoretical structural life, and forcing the program to include these contributions can lead to unrealistic numerical results. To avoid this problem, FAARFIELD disregards any CDF contribution less than a threshold value set at CDF = 0.0001. If CDF contributions from all aircraft are higher than the threshold, FAARFIELD follows the flowchart procedure in Figure 2 with no change. Otherwise:

1. If the maximum CDF computed at step 2 is less than the threshold value, then skip steps 2 through 4. In this case, the critical aircraft is the aircraft with the maximum ACR from step 1. Find the MAGW as the gross weight of the critical aircraft that gives CDF = 1.0 for the actual number of passes of the critical aircraft. This situation could occur when the pavement under consideration has significant excess structural capacity for the aircraft mix using it (for example, where a pavement has received multiple overlays, or includes excess base thickness for frost protection).

2. If the maximum CDF is greater than the threshold value, but the traffic mix still includes a number of light aircraft, there are two possibilities. If the individual contributions of all aircraft to maximum CDF are fewer than the threshold, follow the procedure in step 1. Otherwise, compute the MAGW according to Figure 2, except:

    a. At each iteration, check if the contribution to the maximum CDF of any particular aircraft is less than 0.0001. If so, then disregard that aircraft when summing the total CDF for equivalent passes. (Therefore, the CDF "target" might be slightly less than the maximum total CDF in step 2.)

    b. Compute the number of equivalent passes of the critical aircraft as the number of passes of the critical aircraft at its operating GW, that gives the CDF in (a).

4. FLEXIBLE PAVEMENT RESULTS SUMMARY

PCN–PCR comparisons were made for five flexible runways taken from the FAA's Extended Airport Pavement Life (EAPL) database (Ashtiani, Murrell, Speir, & Brill, 2022). A summary is presented in Table 4. For each airport, three numbers are presented:

- PCN as actually reported by the airport on the AMR
- PCN as computed by the method of AC 150/5335-5C, using the COMFAA 3.0 program
- PCR as computed by the method of AC 150/5335-5D, using FAARFIELD 2.0

Table 4. Summary of Flexible PCN–PCR Evaluations by AC 150/5335-5C and -5D Methods

Airport	Runway	PCN as reported on AMR	AC 150/5335-5C PCN (COMFAA)	PCR (FAARFIELD 2.0)
A	10-28	105/F/A	Not Valid	6620/F/A
B	10L-28R	61/F/C	71/F/C	570/F/C
B	10R-28L	77/F/C	78/F/C	780/F/C
C	01-19	57/F/B	65/F/B	680/F/B
F	9-27	65/F/D	Not Valid	3770/F/D

5. RIGID PAVEMENT RESULTS SUMMARY

PCN–PCR comparisons were made for five rigid runways, three of which were taken from the FAA's EAPL database and two from other sources. A summary is presented in Table 5. For each airport, three numbers are presented:

- PCN as actually reported by the airport on AMR
- PCN as computed by the method of AC 150/5335-5C, using the COMFAA 3.0 program
- PCR as computed by the method of AC 150/5335-5D, using FAARFIELD 2.0

Table 5. Summary of Rigid PCN–PCR Evaluations by AC 150/5335-5C and -5D Methods

Airport	Runway	PCN as reported on AMR	AC 150/5335-5C PCN (COMFAA)	PCR (FAARFIELD 2.0)
D	10R-28L	74/R/B	77/R/B	1040/R/B
E	10C-28C	96/R/C	103/R/B	1140/R/C
G	16L-34R	92/R/B	96/R/B	1660/R/C
H	5R-23L	93/R/B/W/T	91/R/B	1040/R/B
I	17L-35R	N/A	29/R/A	250/R/A

6. DETAILED FLEXIBLE RUNWAY PCN–PCR ANALYSES

6.1 AIRPORT A—LARGE HUB

Runway 10-28 is 10,500 ft long and 150 ft wide with 35-ft shoulders. The surface is HMA. The currently reported PCN on the AMR is 105/F/A/W/T. The runway consists of a central part with a base structure more than 50 years old, and two runway extensions constructed in 1993. The central part has received several HMA overlays over the years, the most recent was a 2-in. HMA overlay in 2011. The extensions also received a 2-in. HMA overlay in 2011. Considering all overlays, the flexible structures can be taken as follows:

Runway 10-28—Central Sections:

- 21 in. HMA (P-401)
- 4 in. crushed aggregate base (P-209)
- 15.5 in. aggregate subbase (P-154)
- Subgrade: Silty sand with gravel, E = 36,500 psi / CBR 24 (subgrade category A)

Runway 10-28—Extensions:

- 11 in. HMA (P-401)
- 22 in. crushed aggregate base (P-209)
- 6 in. aggregate base (P-154)
- Subgrade: Silty sand with gravel, E = 36,500 psi / CBR 24 (subgrade category A)

Table 6 lists the design aircraft traffic.

Table 6. Design Aircraft Traffic for Airport A, Runway 10-28

No.	Aircraft	Gross Weight (lb)	Annual Departures
1	A300-600 Std Bogie	375,000	1,383
2	A330-200 WV058	571,000	41
3	B767-300 ER/Freighter	409,000	15
4	B767-200	335,000	358
5	A310-300	337,000	303
6	B777-200 ER	662,000	320
7	B787-8	502,500	148
8	A318-100 std	130,100	446
9	A319-100 std	141,094	5,781
10	A320-200 std	162,040	10,291
11	A321-100 std	183,000	702
12	B717-200 HGW	110,100	15,700
13	B727-200 Advanced Option	209,000	1,476
14	B737-300	124,500	14,512
15	B737-700	171,000	75,464
16	B737-800	171,000	5,804
17	B737-900	174,200	19
18	B757-200	240,000	1,097
19	B757-300	270,000	2,577
20	B757-200	250,000	1,810
21	DC9-32	109,000	260
22	Learjet 35/36/35A/36A	18,300	1,273
23	MD-83	150,500	371
24	D-75	80,500	1,357
25	D-100	103,593	8,687
26	D-75	72,500	17,360
27	D-50	53,000	16,384
28	D-30	34,500	7,555
29	S-5	5,500	1,200
30	S-10	8,750	2,820
31	S-5	4,750	266

6.1.1 COMFAA 3.0 Analysis

Using the default layer equivalency factors embedded in the support spreadsheet, obtain the following equivalent total thicknesses for analysis:

Central Sections: 58.7 in.
Extensions: 52.0 in.

For PCN computation, use weaker section (t = 52 in.)

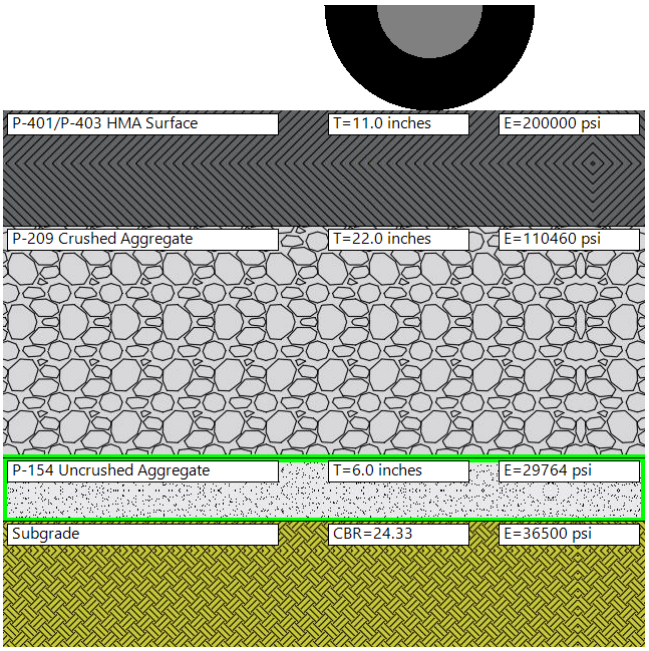
Based on COMFAA 3.0 analysis, the runway structure has considerable excess capacity in relation to the imposed aircraft loads. COMFAA PCN numbers on subgrade category A range from 442 to more than 600 depending on the reference aircraft. However, these numbers are based on unrealistically high maximum gross weights and essentially indicate unlimited life. In practice, the airport published a PCN approximately 50 percent greater than the largest ACN of operating aircraft in the mix (i.e., sufficient to allow unrestricted operations of any foreseeable using aircraft).

6.1.2 FAARFIELD 2.0 Analysis (As-Built)

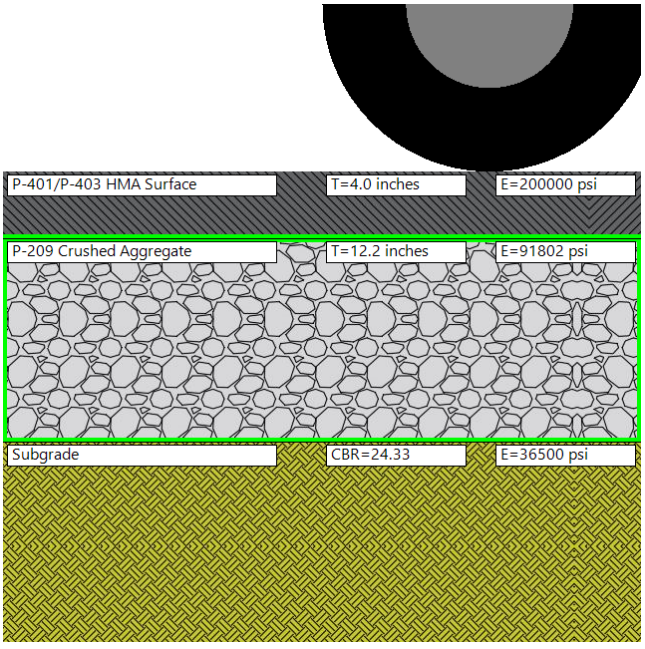
The PCR method using FAARFIELD 2.0 gives PCR 6617/F/A/X/T, based on the A330-200 as critical aircraft. Rounding to the nearest whole-value multiple of 10, the PCR could be reported as 6620/F/A. This value reflects the theoretical upper limit on ACR as computed by FAARFIELD, but actually represents unlimited structural capacity, since it is much higher than the ACR value of any existing or foreseeable aircraft. In practice, the airport would probably publish a PCR value to accommodate the largest real aircraft that could conceivably use the feature. Figure 5(a) shows the FAARFIELD structure, and Figure 6(a) shows the graphical program output. The complete FAARFIELD PCR results tables are presented in Appendix A.

6.1.3 FAARFIELD 2.0 (Using FAARFIELD 2.0 Design Thickness)

The PCR analysis in 4.1.2 reveals that Runway 10-28 has considerable excess capacity. Figure 5(b) shows the structure as designed by FAARFIELD 2.0 for the given traffic and subgrade properties. A conventional pavement structure 16.5 in. thick above the subgrade would be sufficient to meet the 20-year structural life requirement. (It would not meet FAA standards due to the lack of a stabilized base layer.) Using an assumed total thickness t = 16.5 in. (4 in. P-401 surface and 12.5 in. P-209 base), obtain PCR 700/F/A, where the A330 is again the critical aircraft. For this case, there would be no operating weight restrictions on any using aircraft (Figure 6(b)).

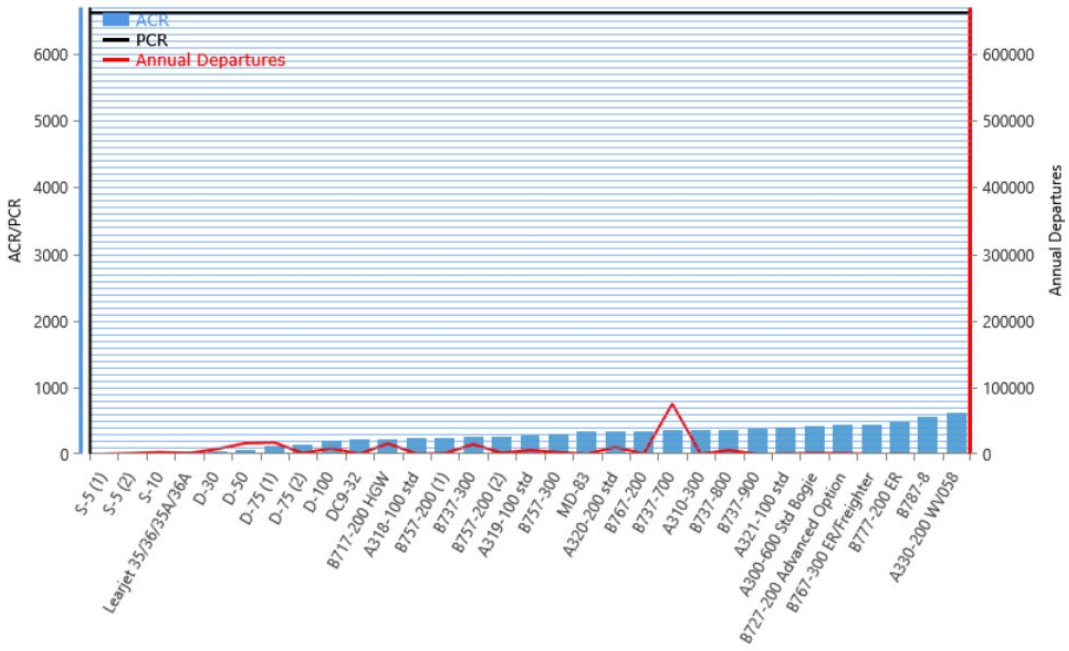


(a) As-Built

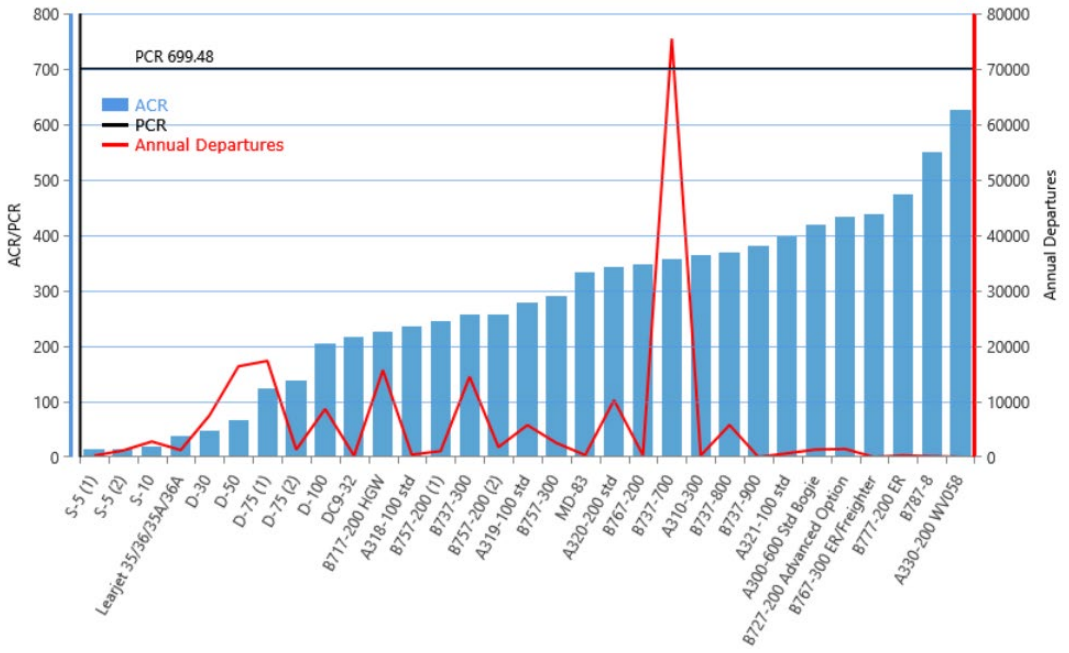


(b) FAARFIELD 2.0 Design

Figure 5. FAARFIELD PCR Evaluation Structures for Airport A, Runway 10-28



(a) As-Built



(b) FAARFIELD 2.0 Design

Figure 6. Airport A, FAARFIELD PCR Graphical Output

6.2 AIRPORT B—MEDIUM HUB (RUNWAY 10L-28R)

Runway 10L-28R is 8,000 ft long and 150 ft wide. The surface is HMA. The currently reported PCN on the AMR is 61/F/C/W/T. The runway consists of a central section (6,000 ft) with a base structure more than 50 years old, and two runway extensions of 1,000 ft each. The central part has received several HMA overlays over the years. Considering all overlays, the flexible structures can be taken as follows:

Runway 10L-28R—Central Sections:

- 11.75 in.–18.5 in. HMA (P-401)
- 5-in. asphalt treated drainable base
- 11-in. aggregate subbase (unknown material)
- Subgrade: Lean Clay, E = 11,000 psi / CBR 7 (subgrade category C)

Runway 10L-28R—Extensions:

- 11-in. HMA (P-401)
- 17-in. crushed aggregate base (P-209)
- 12–24 in. #2 stone subbase (P-154)
- Subgrade: Lean Clay, E = 11,000 psi / CBR 7 (subgrade category C)

Table 7 lists the design aircraft traffic.

Table 7. Design Aircraft Traffic for Airport B, Runway 10L-28R

No.	Aircraft	Gross Weight (lb)	Year 1 Annual Departures	Growth Rate (percent)	Avg. Annual Departures (over 20 years)
1	S-10	10,000	1	2.0	1
2	D-30	30,000	3	2.0	4
3	CRJ100/200	47,450	2,909	2.0	3,491
4	ERJ-145 XR	53,131	7,546	2.0	9,055
5	Q400/Dash 8 Series 400	60,198	742	2.0	890
6	CRJ700	72,500	1,461	2.0	1,753
7	Gulfstream-G-IV	74,600	2	2.0	3
8	CRJ900	80,500	218	2.0	262
9	EMB-175 STD	89,000	4,328	2.0	5,194
10	B737-200	128,600	9	2.0	11
11	EMB-190 STD	114,000	60	2.0	72
12	B717-200 HGW	121,000	874	2.0	1,049
13	DC9-51	122,000	60	2.0	72
14	B737-500	134,000	138	2.0	166
15	B737-300	140,000	1,691	2.0	2,029
16	A319-100 std	145,505	895	2.0	1,074
17	B737-400	150,500	10	2.0	12
18	B737-700	154,500	2,789	2.0	3,347
19	MD-83	161,000	1,339	2.0	1,607

No.	Aircraft	Gross Weight (lb)	Year 1 Annual Departures	Growth Rate (percent)	Avg. Annual Departures (over 20 years)
20	MD-90-30 ER	168,500	100	2.0	120
21	B737-800	174,700	433	2.0	520
22	A321-100 std	183,000	1	2.0	1
23	B737-900	188,200	1	2.0	1
24	B727-200 Advanced Option	209,500	1	2.0	1
25	B757-200	256,000	67	2.0	80
26	B767-200 ER	396,000	1	2.0	1
27	C-17A	585,000	233	2.0	280
28	S-3	3,000	579	1.0	637
29	S-5	5,000	2,314	1.0	2,545
30	D-15	10,000	165	1.0	182
31	D-20	20,000	661	1.0	727
32	D-30	30,000	2,892	1.0	3,181

6.2.1 COMFAA 3.0 Analysis

In the previous sections, assume that asphalt-treated drainable base is structurally equivalent to P-209 base. Assume that aggregate subbase is equivalent to P-154. For the central sections, the in-place HMA thickness varies from 11.75 to 18.5 in. Assume 11.75 in. P-401. For the runway extensions, the actual thickness of subbase varies between 12 and 24 in. Assume 12 in. P-154. Using the default layer equivalency factors embedded in the support spreadsheet, obtain the following equivalent total thicknesses for analysis:

Central Sections: 34.9 in.
Extensions: 51.0 in.

For PCN computation, use weaker (central) section (t = 34.9 in.). Based on COMFAA 3.0 analysis, the technical PCN could be as high as 93/F/C, based on the B727 as the most demanding aircraft (Figure 7). However, eliminating aircraft with very few annual departures (B727, B767, B737-900, and A321 each have only 1 annual departure in the design traffic list), it is recommended to report the PCN as 71/F/C/W/T (using the MD-90) or 68/F/C/W/T (using the B737-800).

6.2.2 FAARFIELD 2.0 Analysis

FAARFIELD 2.0 computes the PCR based on the ACR/PCR method. For the central section, FAARFIELD computes PCR 572/F/C (reported as 570/F/C), based on the C-17A as reference aircraft. For this analysis, the 5-in. asphalt-treated drainable base is represented by a user-defined layer with a modulus equal to that for P-209 (Figure 8). The graphical output from FAARFIELD is shown in Figure 9. Although the B727 has a higher ACR, it is not the critical aircraft because there are fewer than 10 annual departures (see page 3). The complete FAARFIELD PCR results tables are presented in Appendix A.

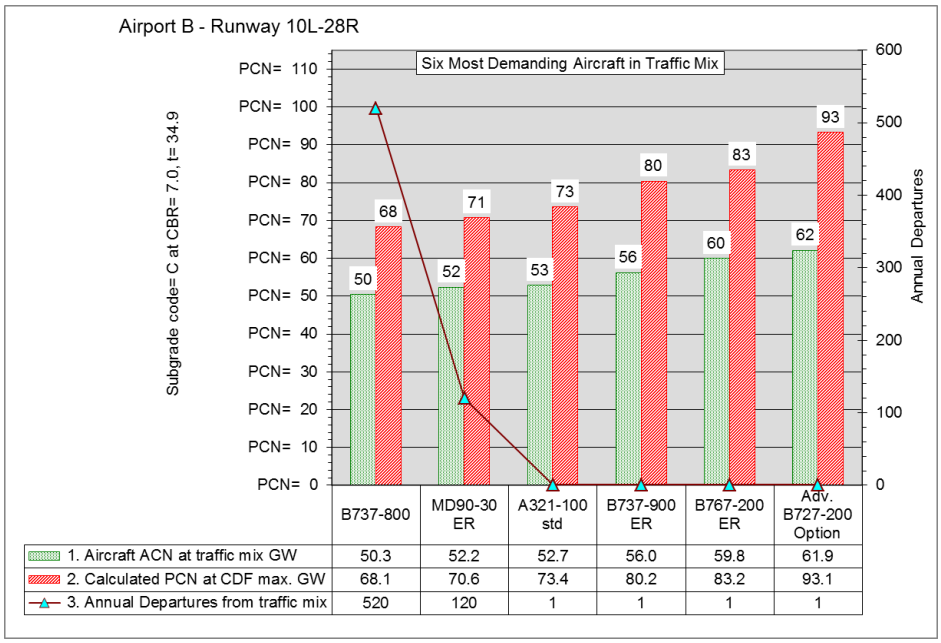


Figure 7. COMFAA 3.0 Graphic Output, Airport B, Runway 10L-28R

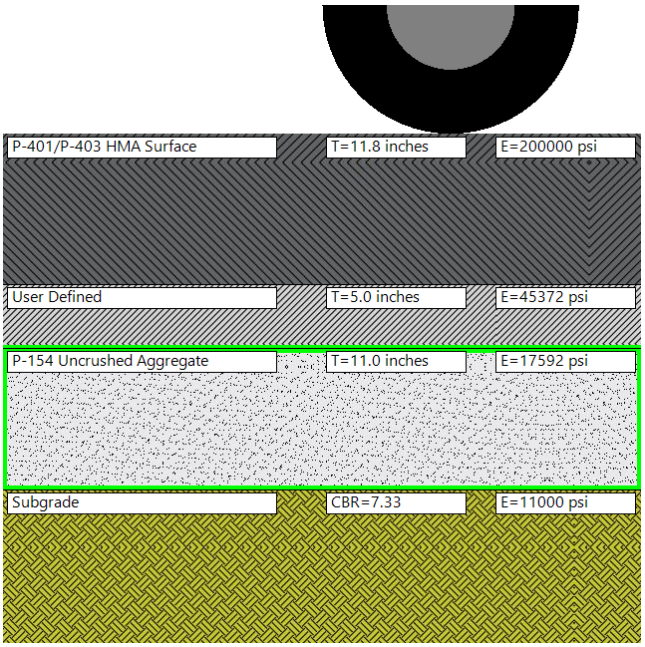


Figure 8. FAARFIELD PCR Evaluation Structure, Airport B, Runway 10L-28R (Central Sections)

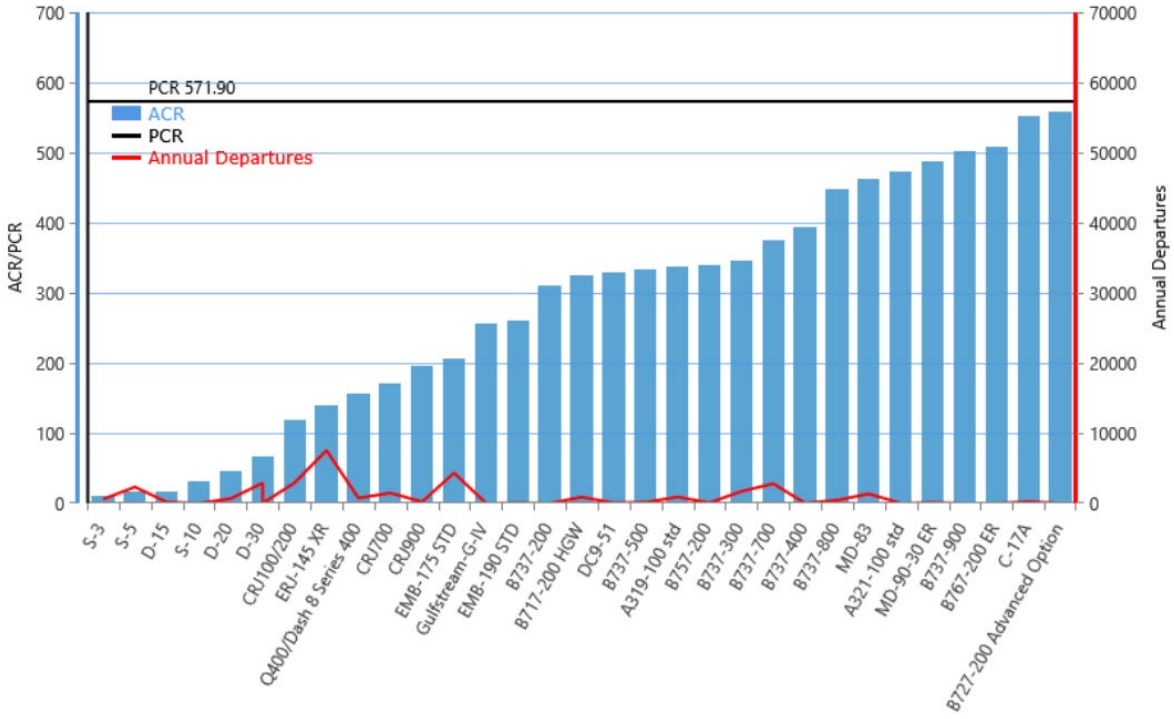


Figure 9. FAARFIELD PCR Graphical Output, Airport B, Runway 10L-28R (Central Sections)

For comparison, if the newer runway extension sections are evaluated rather than the central sections, then FAARFIELD would give PCR 1218/F/C (reported as 1220/F/C), with the C17 as the critical aircraft. In this case, the pavement section has significant excess capacity compared to the using traffic. Therefore, the choice of the central sections as the PCN evaluation section is the correct one.

6.3 AIRPORT B—MEDIUM HUB (RUNWAY 10R-28L)

Runway 10R-28L is 10,125 ft long and 150 ft wide. The surface is HMA. The currently reported PCN on the AMR is 77/F/C/W/T. The runway was constructed in 2013 using the following section:

- 5 in. HMA surface (P-401)
- 11 in. HMA base (P-401)
- 12 in. crushed aggregate subbase (P-209)
- 12 in. cement-stabilized subgrade (P-301)

Existing subgrade soils were of poor quality and potentially contaminated. The 12-in. cement-stabilized soil layer was added to provide a higher CBR while minimizing disturbance of the existing subgrade. A CBR value of 7 is assumed at the top of the cement-stabilized subgrade.

Table 8 lists the design aircraft traffic.

Table 8. Design Aircraft Traffic for Airport B, Runway 10R-28L

No.	Aircraft	Gross Weight (lb)	Annual Departures
1	B767-300	317,000	365
2	B757-200	256,000	1,360
3	B737-900	188,200	1,360
4	B737-800	174,700	4,380
5	MD-83	161,000	365
6	B737-400	150,500	365
7	B737-300	140,000	17,885
8	B737-500	134,000	2,920
9	B717-200 HGW	122,000	35,310
10	CRJ900	84,500	6,570
11	CRJ700	75,000	18,615
12	ERJ-145 ER	48,500	32,405
13	S-10	8,750	550
14	S-3	2,300	600
15	D-30	30,000	6,525
16	S-10	10,000	15,225
17	D-50	50,000	40,400

6.3.1 COMFAA 3.0 Analysis

The equivalent pavement thickness is computed using only the layers above the stabilized subgrade. Assume the stabilized subgrade provides a CBR value of 7 for the flexible pavement. Using the default layer equivalency factors embedded in the support spreadsheet that accompanies AC 150/5335-5C, and using the reference section appropriate for heavier aircraft (5 in. P-401 and 8 in. P-209), obtain the equivalent total thickness for analysis: t = 43.2 in.

From COMFAA 3.0 analysis, the technical PCN is found to be 77.6/F/C, based on the B737-800 as the reference aircraft. (A higher value of 110/F/C could be reported based on the B737-900 as the most demanding aircraft.) The COMFAA graphic output is shown in Figure 10.

6.3.2 FAARFIELD 2.0 Analysis

FAARFIELD 2.0 computes PCR using the AC 150/5335-5D method. The FAARFIELD 2.0 analysis assumes that the stabilized subgrade provides a CBR value of 7 for the flexible pavement, and all layers above the stabilized subgrade are included in the model (Figure 11). FAARFIELD computes PCR as 775/F/C (reported as 780/F/C), based on the B737-900 ER as the critical aircraft. The graphical output from FAARFIELD is shown in Figure 12. There are no operating weight restrictions on the using aircraft. The complete FAARFIELD PCR results tables are presented in Appendix A.

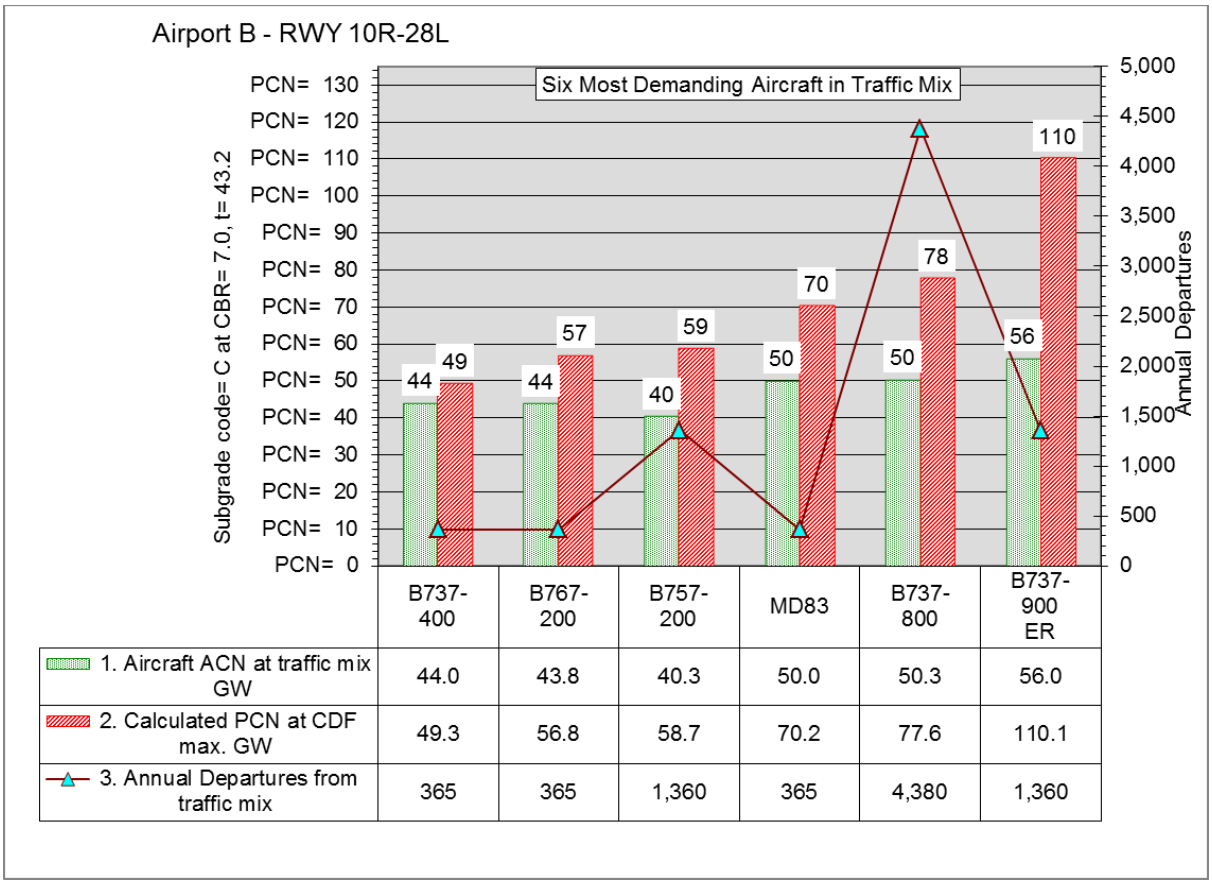


Figure 10. COMFAA 3.0 Graphic Output, Airport B, Runway 10R-28L

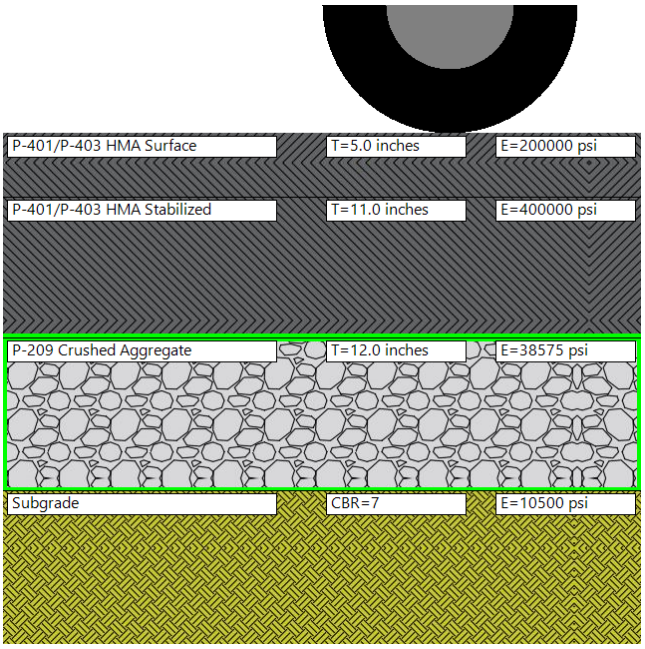


Figure 11. FAARFIELD PCR Evaluation Structure, Airport B, Runway 10R-28L

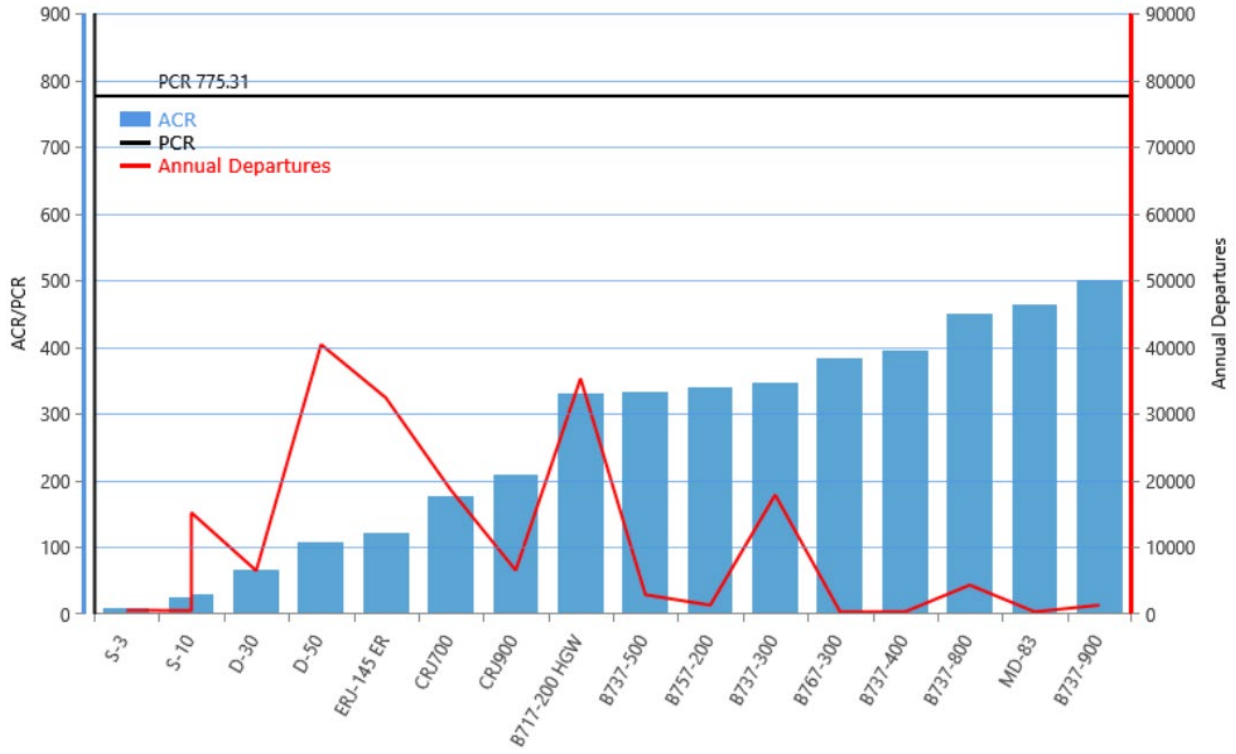


Figure 12. FAARFIELD PCR Graphical Output, Airport B, Runway 10R-28L

6.4 AIRPORT C—LARGE HUB

Runway 01-19 is 7,170 ft long and 150 ft wide. The surface is HMA. The currently reported PCN on the AMR is 57/F/B/X/T. The runway was originally constructed in 1990. In 2011–2012, a mill and overlay were completed for the entire length, and a 300-ft-long extension was added to the 01 end. At the time of the rehabilitation, a pavement evaluation was performed, which identified considerable variation in existing pavement layer thicknesses along the runway length. For purposes of PCN evaluation, the weakest section is as follows:

- 14 in. HMA (P-401)
- 13.5 in. aggregate base (P-154)
- Subgrade: silty sand (SM)

The design CBR is 10. Table 9 lists the design aircraft traffic.

Table 9. Design Aircraft Traffic for Airport C, Runway 01-19

No.	Aircraft	Gross Weight (lb)	Annual Departures
1	CRJ100ER/200ER	51,000	6,169
2	CRJ700	71,000	2,210
3	ERJ-145 ER	42,300	15,675
4	EMB-170 STD	85,100	5,626
5	EMB-190 STD	114,200	6,661

No.	Aircraft	Gross Weight (lb)	Annual Departures
6	B717-200 HGW	121,000	7,493
7	B737-300	140,000	3,330
8	B737-700	153,500	10,032
9	B737-800	173,000	7,524
10	B737-900	174,200	209
11	MD-83	140,000	5,706
12	A319-100 opt	154,300	14,986
13	A320-200 std	162,000	10,407
14	A321-100 std	181,200	1,249
15	B757-200	240,000	8,031
16	B767-300	345,000	207

6.4.1 COMFAA 3.0 Analysis

First, compute the equivalent pavement thickness using the COMFAA support spreadsheet. Due to the high variability and deteriorated condition of the existing HMA, use conservative equivalency factors on the low end of the FAA-recommended range. The equivalency factors are:

P-401 to P-209: 1.2
P-209 to P-154: 1.2

For the above structural thicknesses and equivalency factors, obtain an equivalent thickness $t = 29.9$ in. Based on subgrade CBR = 10, the subgrade category is B. From the COMFAA analysis, obtain PCN = 65/F/B/X/T, using the A321 as reference aircraft. The COMFAA graphic output is shown in Figure 13.

6.4.2 FAARFIELD 2.0 Analysis

FAARFIELD 2.0 computes PCR using the AC 150/5335-5D method. FAARFIELD computes PCR 677/F/B (reported as 680/F/B), based on the A321-100 as critical aircraft. Figure 14 shows the evaluation structure for FAARFIELD 2.0. Note that the subgrade category has changed from the ACN/PCN method. The graphical output from FAARFIELD is shown in Figure 15. There are no operating weight restrictions on the using aircraft. The complete FAARFIELD PCR results tables are presented in Appendix A.

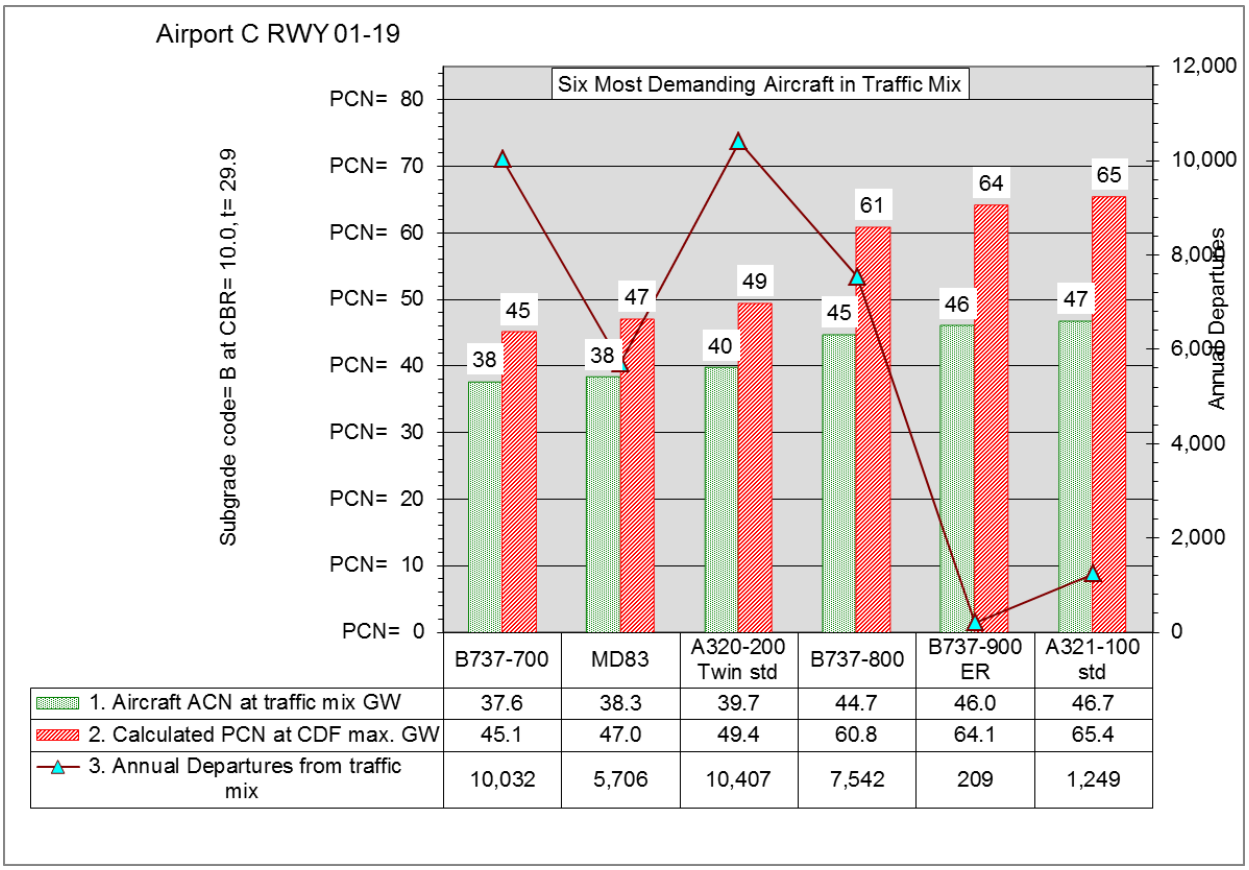


Figure 13. COMFAA 3.0 Graphic Output, Airport C, Runway 01-19

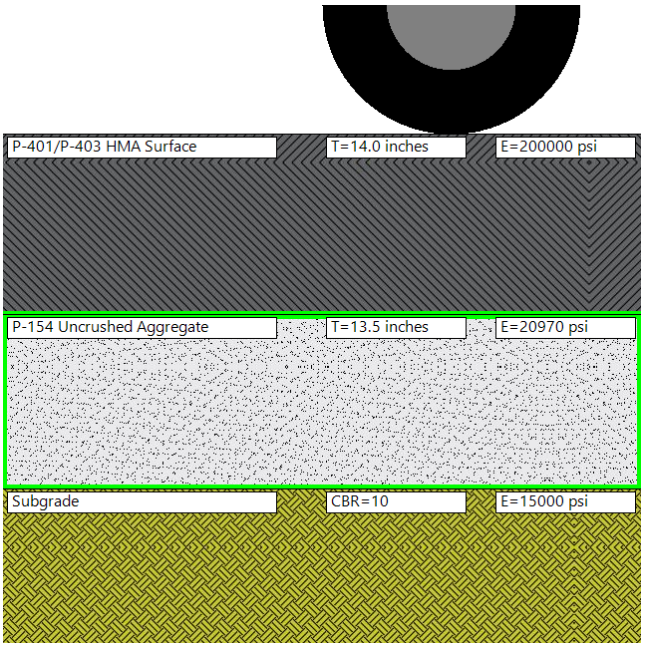


Figure 14. FAARFIELD PCR Evaluation Structure, Airport C, Runway 01-19

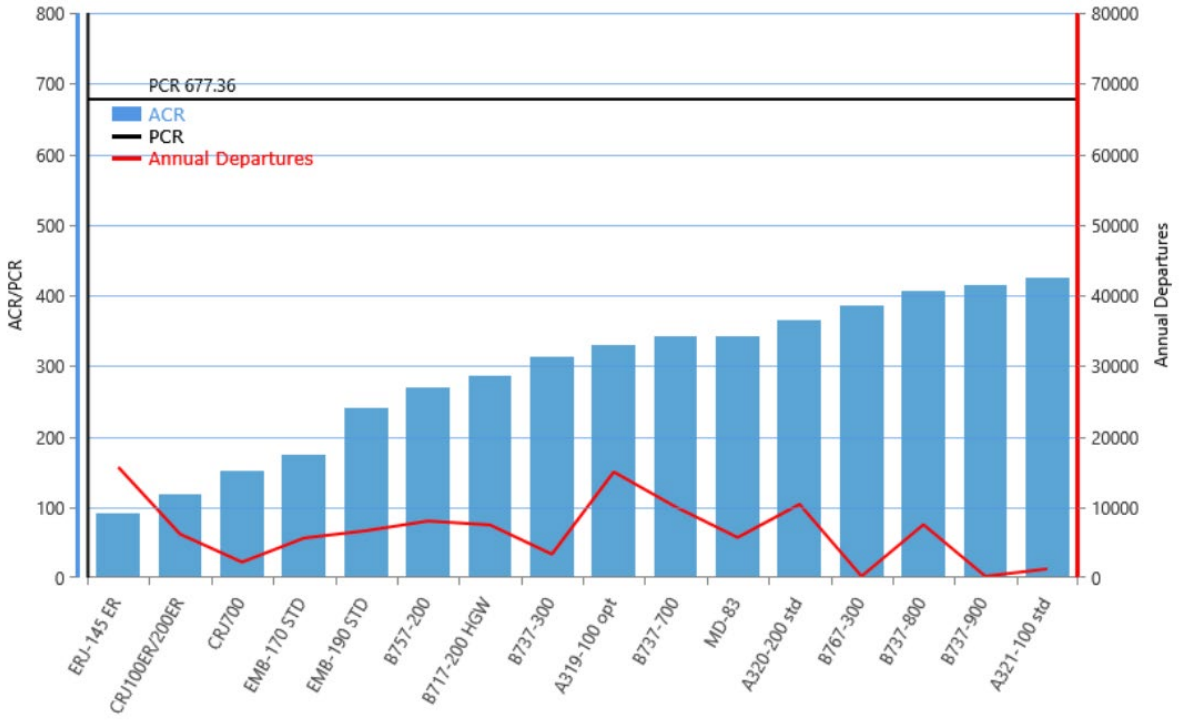


Figure 15. FAARFIELD PCR Graphical Output, Airport C, Runway 01-19

6.5 AIRPORT F—MEDIUM HUB

Runway 9-27 is 9,500 ft long and 150 ft wide. The surface is HMA, except for a 1,155-ft length at the intersection with a crossing runway, which is Portland cement concrete (PCC). The runway was constructed in 1968 as a PCC pavement. At the time of initial construction, the PCC section was 10 in., except for 500-ft long sections at each runway end, where the PCC thickness was increased to 12 in. Subsequent overlays in 1981, 1997, and 2012 have increased the total HMA thickness to approximately 10 in. The PCN for this composite pavement is reported on the AMR as 65/F/D/W/T.

The composite pavement section is as follows:

- 10 in. HMA Overlay (P-401)
- 10 in. old PCC (P-501)
- 6 in. HMA base (P-403)
- 4 in. aggregate base (P-154)

Resilient modulus tests performed on soil borings from the center of the runway gave a low-end value of approximately 7,400 psi. Therefore, using the approximate conversion CBR = E / 1500, assume CBR 5 for evaluation. Table 10 lists the design aircraft traffic.

Table 10. Design Aircraft Traffic for Airport F, Runway 09-27

No.	Aircraft	Gross Weight. (lb)	Annual 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

6.5.1 COMFAA 3.0 Analysis

Assume a standard structure with 5 in. P-401, 8 in. P-209, and an equivalent thickness of P-154 subbase to be determined. Use the following equivalency factors to obtain the equivalent thickness:

P-401 to P-209: 1.6
P-501 to P-401: 2.5
P-209 to P-154: 1.4
P-401 to P-154: 2.2

Exist. 10 in. P-401 overlay à 5 in. P-401 + 8 in. P-209
Exist. 10 in. P-501 à 25 in. P-401 à 57.5 in. P-154
Exist. 6 in. P-401 base à 13.2 in. P-154

The resulting equivalent structure is as follows:

- 5 in. P-401
- 8 in. P-209
- 57.5 + 13.2 + 4 = 74.7 in. P-154
- Subgrade: CBR 5

The equivalent thickness for the given structure is t = 87.7 in. (subgrade category C).

Using COMFAA 3.0, with t = 87.7 in. on CBR 5, using the B757 as reference aircraft, obtain PCN 178/F/C. (The A319 is disregarded.) However, COMFAA also produces a warning message indicating that the computation may not be meaningful due to the high strength relative to loading:

> *When computing the numbers of coverages to failure, the coverages for none of the aircraft converged at a pavement thickness greater than 99 percent of the evaluation thickness. This means that the life of the pavement is unlimited and the pavement is very strong in relation to the aircraft loading. The relative aircraft load evaluations are also unreliable. Consider reviewing the procedures used to determine the evaluation thickness and the strength of the support.*

The COMFAA graphical output is shown in Figure 16.

6.5.2 FAARFIELD 2.0 Analysis

FAARFIELD 2.0 computes PCR using the AC 150/5335-5D method. In this case, the pavement consists of a thick HMA overlay over old PCC, so it could plausibly be reported as either F or R, depending on whether the PCC slab provides the primary structural contribution. The FAARFIELD structure is shown in Figure 17(a). To represent the probable poor condition of the existing PCC, the evaluation assumed the minimum Structural Condition Index (SCI), SCI = 67. Using the option to "allow flexible computation for thick overlays on PCC," FAARFIELD automatically determined that the alternate flexible computation governs and, therefore, reports a flexible (F) PCR.

FAARFIELD 2.0 computes PCR 3645/F/D, with the MD11ER as the critical aircraft. The B787-9 is the highest ACR aircraft but is not the critical aircraft because it has too few annual departures. The graphical output from FAARFIELD is shown in Figure 18. There are no weight restrictions on any of the design list aircraft. The complete FAARFIELD PCR results tables are presented in Appendix A.

For clarity, Figure 17(b) shows the alternate structure used to compute flexible PCR, which converts the PCC to a high-stiffness, user-defined layer. The alternate criteria are available only for cases where the HMA overlay thickness equals or exceeds the base PCC layer thickness. This example just meets that criterion. Provided the flexible option is enabled, FAARFIELD makes the selection automatically, and never actually displays the "alternate" structure in Figure 17(b). By contrast, if the FAARFIELD flexible option is disabled, then the PCR function returns PCR 770/R/D, based on the assumption of a rigid pavement structure (Figure 19). With this assumption, the available rigid PCR is much lower, and requires operating weight restrictions on several aircraft. Therefore, the airport should report the flexible PCR.

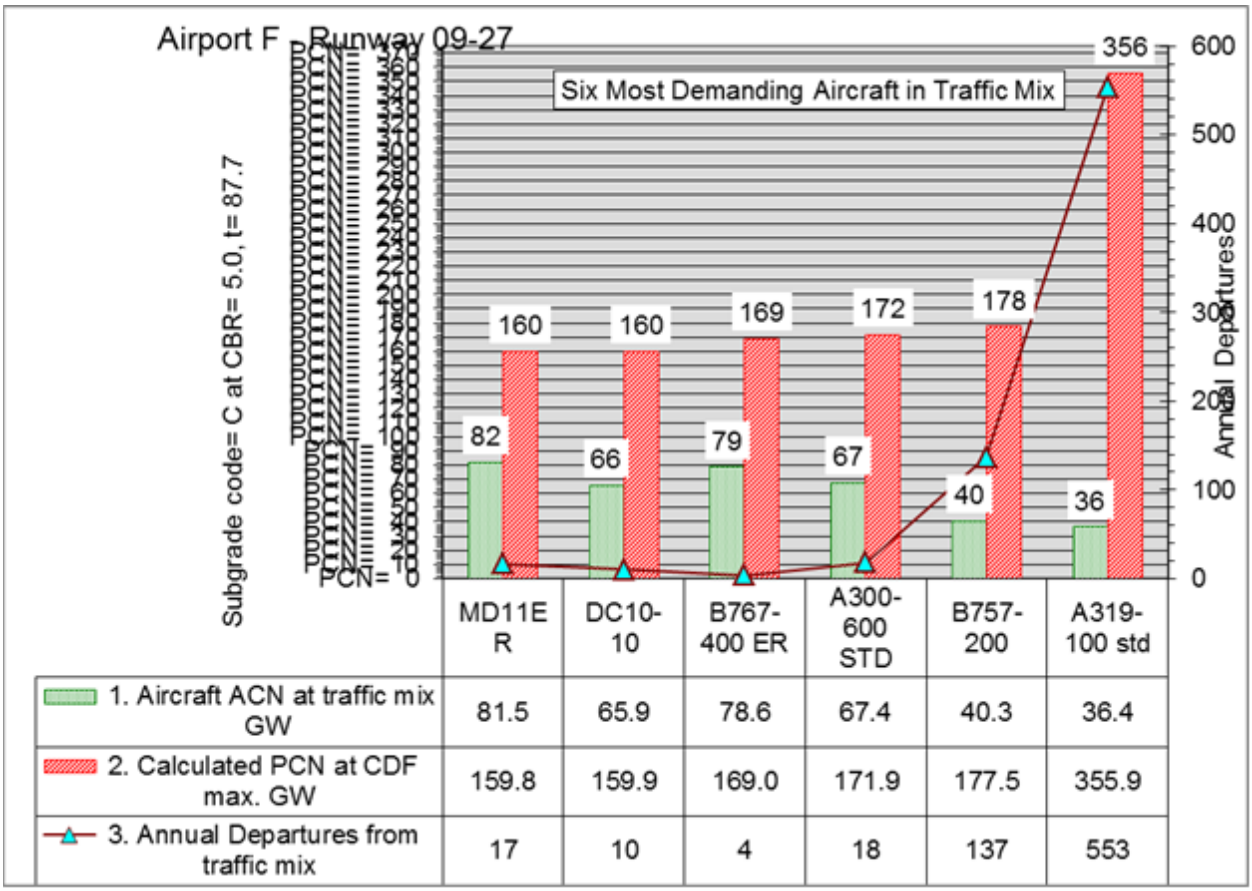
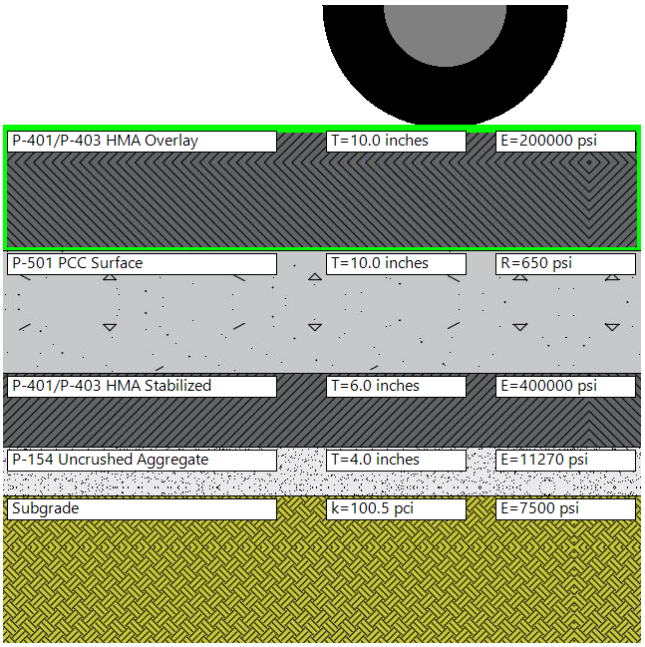


Figure 16. COMFAA 3.0 Graphic Output, Airport F, Runway 09-27



(a) Evaluation Structure, Represented as HMA-on-Rigid Overlay

(b) Alternate Evaluation Structure (flexible)

Figure 17. FAARFIELD PCR Evaluation Structure for Airport F, RUNWAY 09-27

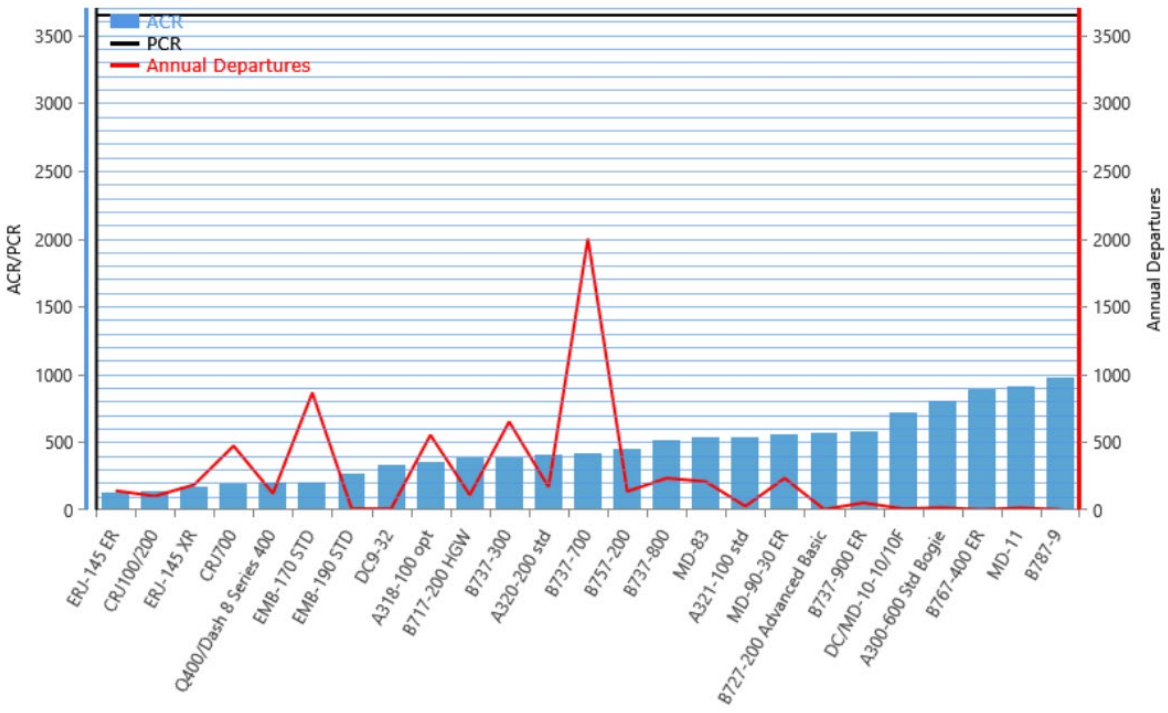


Figure 18. FAARFIELD PCR Graphical Output, Airport F, Runway 09-27

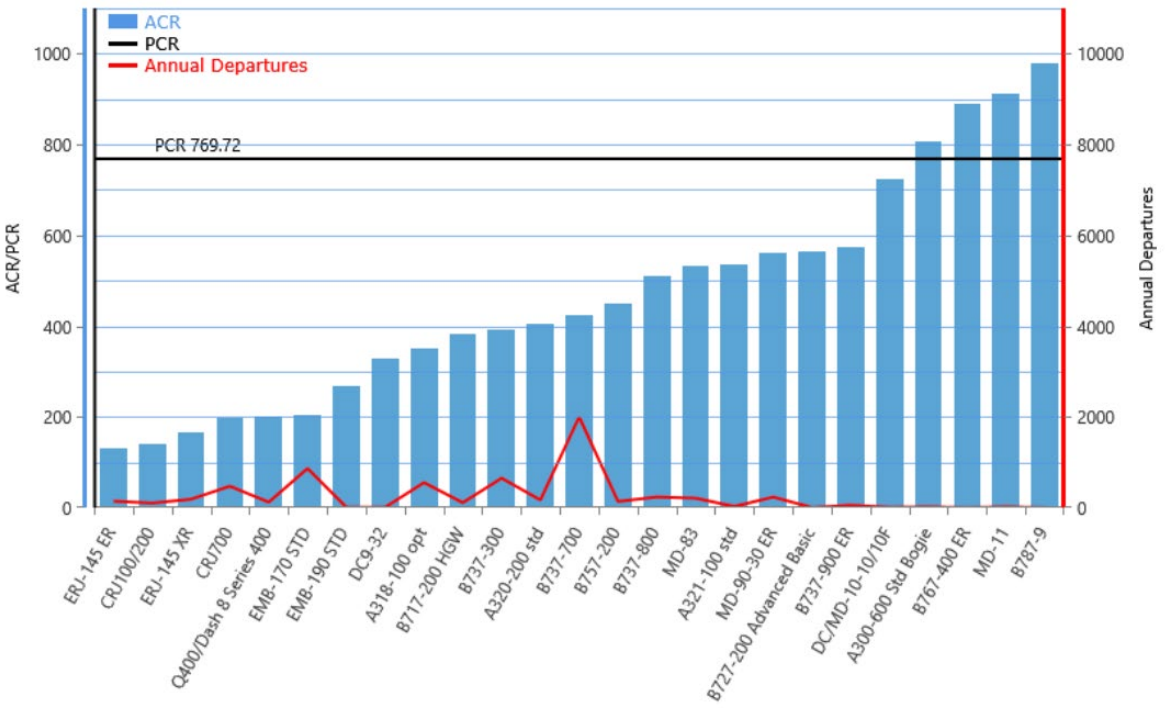


Figure 19. FAARFIELD PCR Graphical Output, Airport F, Runway 09-27 (Rigid PCR)

7. DETAILED RIGID RUNWAY PCN–PCR ANALYSES

7.1 AIRPORT D—LARGE HUB

Runway 10R-28L is 8,000 ft long and 150 ft wide with 35-ft shoulders. The surface is PCC. At the time of the evaluation, the runway was 2 years old and had not received any overlays. The airport reported PCN 74/R/B/W/T on the AMR. Part of the runway consists of a bridge constructed over a railroad track and adjacent major highway. Approaches to the bridge structure on both sides are constructed on embankments. The fill material is compacted lime rock with soaked CBR greater than 50. However, in non-fill sections the in-situ CBR used for design is CBR 13. The rigid pavement section is as follows:

- 16.5 in. PCC (P-501), R = 675 psi
- 6 in. cement-treated base (P-304)
- Prepared subgrade: CBR 13

Table 12 lists the design aircraft traffic.

Table 11. Design Aircraft Traffic for Airport D, Runway 10R-28L

No.	Aircraft	Gross Weight (lb)	Year 1 Annual Departures	Growth Rate (percent)	Avg. Annual Departures (over 20 years)
1	A300-600 Std Bogie	380,518	48	3.88	67
2	A310-200	315,041	22	-10	6
3	A310-300	315,041	16	-10	4
4	A318-100 std	124,341	9,531	.84	10,332
5	A320-200 std	162,922	8,505	5.5	13,183
6	A321-100 std	183,866	1,895	5.72	2,979
7	A330-200 WV020	509,047	7	10	14
8	A330-300 WV020	50,9047	23	10	46
9	A380-800 WV000	1,239,000	12	0	12
10	B727-200 Advanced Basic	185,200	28	-10	7
11	B737-200 Advanced QC	128,600	97	-10	24
12	B717-200 HGW	122,000	415	-10	104
13	B737-300	140,000	571	-10	143
14	B737-400	150,500	381	-10	95
15	B737-500	134,000	74	-10	19
16	B737-700	155,000	9,055	4.77	13,374
17	B737-800	174,700	3,310	5.47	5,121
18	B737-900	174,700	631	9.42	1,225
19	B747-400ER	913,000	2	10	4
20	B757-200	256,000	816	-2.63	601

No.	Aircraft	Gross Weight (lb)	Year 1 Annual Departures	Growth Rate (percent)	Avg. Annual Departures (over 20 years)
21	B757-300	273,500	247	-.91	225
22	B767-200 ER	396,000	12	-10	3
23	B767-300 ER/Freighter	413,000	125	-1.63	105
24	B767-400 ER	451,000	28	10	56
25	B777-200 ER	658,000	18	10	36
26	B787-8	486,000	138	10	276
27	C-130	155,000	182	-1.52	154
28	DC/MD-10-10/10F	458,000	159	0.48	167
29	D-100	100,000	2,100	5.25	3,203
30	D-20	20,000	6,263	1.63	7,284
31	D-30	30,000	1,858	1.65	2,164
32	D-50	45,000	744	7.83	1,327
33	D-75	75,000	91	8.25	166
34	MD-11	633,000	68	-2.49	51
35	MD-83	161,000	527	-10	132
36	MD-90-30 ER	168,500	42	-10	11
37	CRJ100/200	47,450	1,257	10	2,514
38	CRJ700	72,500	616	2.43	766

7.1.1 COMFAA 3.0 Analysis

The design subgrade CBR is 13. Plate load data are unavailable for the subgrade, so assume the top of subgrade *k*-value according to the formula (FAA, 2021b):

$k = 28.6926 \times \text{CBR}^{0.7788} = 211.5$ lb /in.^{3} (pci)

Using the support spreadsheet accompanying AC 150/5335-5C (FAA, 2014), obtain the following equivalent top of subbase *k*-value:

$k = 323$ pci (subgrade category B)

Based on COMFAA 3.0 analysis, using $k = 323$ pci, $t = 16.5$ in., and concrete flexural strength $R = 675$ psi, obtain PCN on B of 76.9, using the MD11 ER as reference aircraft. Report PCN as 77/R/B/W/T. The COMFAA graphical output is shown in Figure 20.

7.1.2 FAARFIELD 2.0 Analysis

FAARFIELD 2.0 computes PCR using the AC 150/5335-5D method. The rigid pavement subgrade was assigned a value of $E = 19{,}500$ psi using the approximate conversion formula $E = 1500 \times \text{CBR}$. The FAARFIELD structure is shown in Figure 21. FAARFIELD 2.0 computes PCR 1036/R/B/W/T (reported as 1040/R/B), with the A380 as critical aircraft. The graphical

output from FAARFIELD is shown in Figure 22. There are no operating weight restrictions on the aircraft that are used. The complete FAARFIELD PCR results tables are presented in Appendix A.

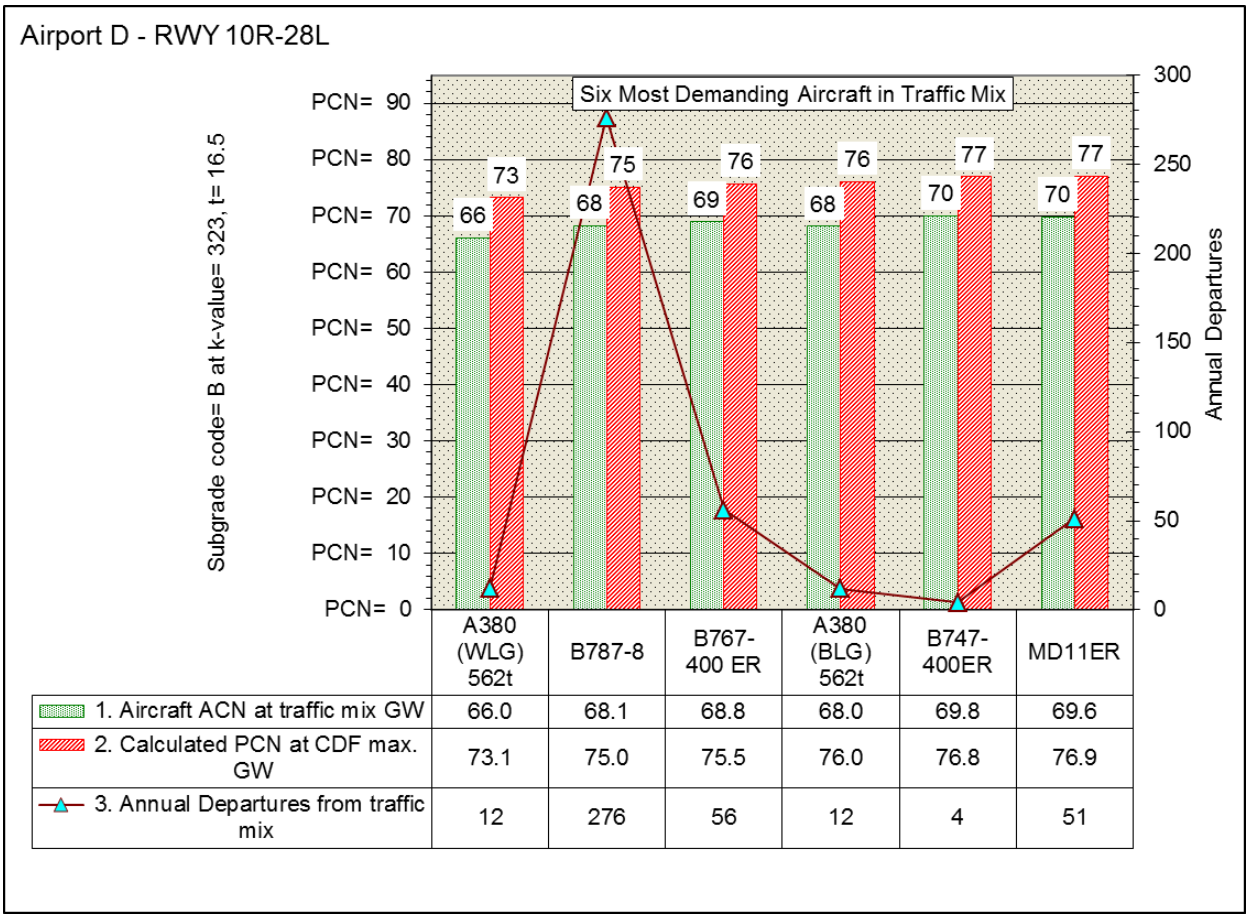


Figure 20. COMFAA 3.0 Graphic Output, Airport D, Runway 10R-28L

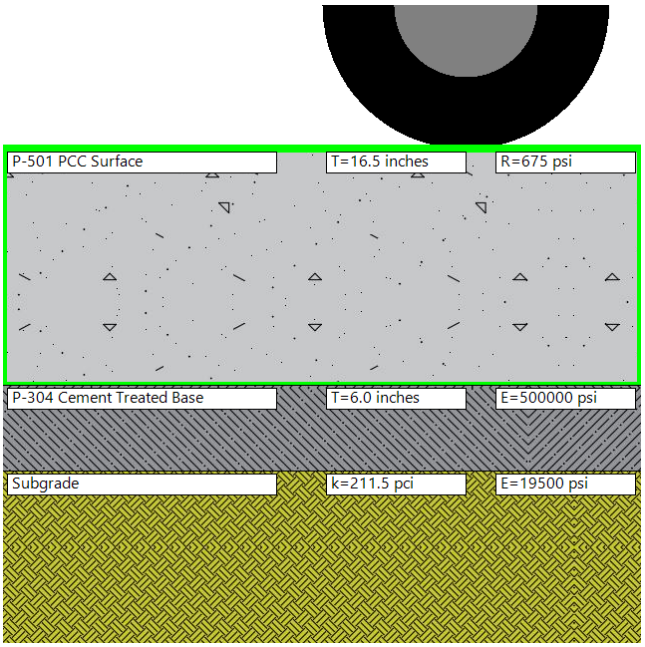


Figure 21. FAARFIELD PCR Evaluation Structure, Airport D, Runway 10R-28L

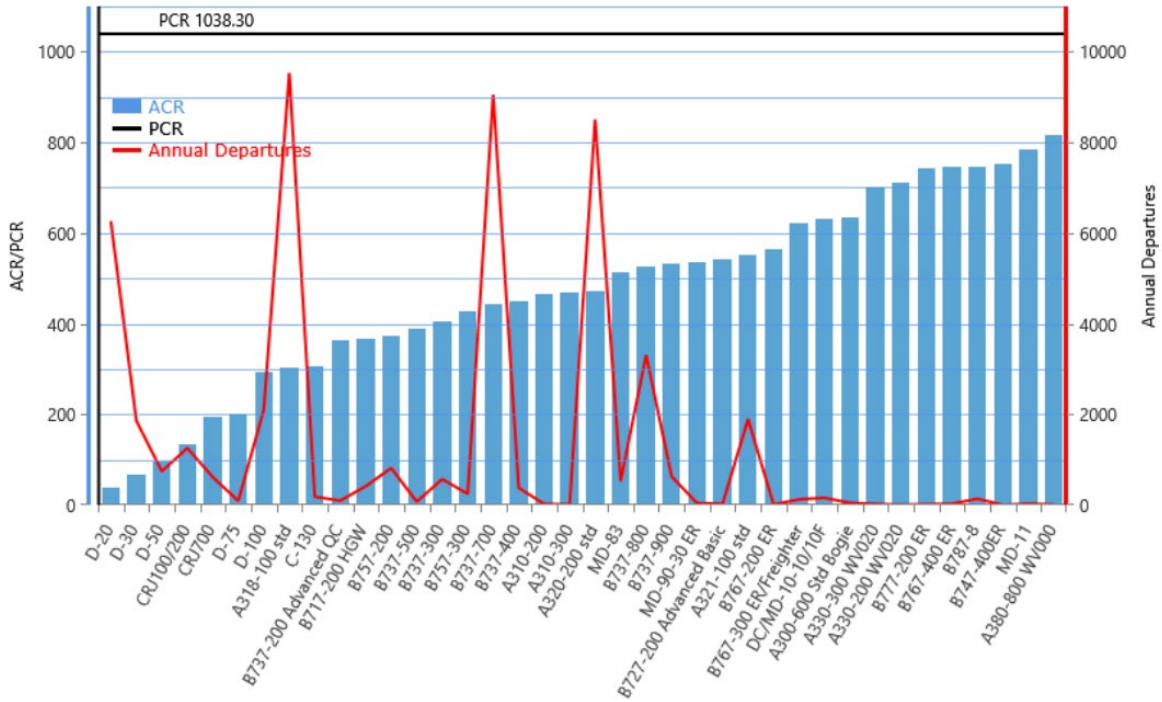


Figure 22. FAARFIELD PCR Graphical Output, Airport D, Runway 10R-28L

7.2 AIRPORT E—LARGE HUB

Runway 10C-28C is 10,800 ft long and 200 ft wide. The surface is PCC. The runway was constructed in 2013 and has not received any overlays. The currently reported PCN on the AMR is 96/R/C/W/T.

The rigid pavement section is as follows:

- 18 in. PCC (P-501), flexural strength R = 700 psi
- 6 in. HMA stabilized base (P-403)
- 6 in. asphalt-treated permeable base (ATPB)
- 12 in. of stabilized subgrade on natural subgrade

The subgrade stabilization provides an estimated top-of-subgrade k-value = 150 pci. For design purposes, the ATPB is assumed to be equivalent to P-209 granular base.

Table 13 lists the design aircraft traffic.

Table 12. Design Aircraft Traffic for Airport E, Runway 10C-28C

No.	Aircraft	Gross Weight (lb)	Annual Departures
1	A330	469,000	81
2	A340-200/300	600,000	840
3	A380-800 (arrivals)	894,000	424
4	B747-400	873,000	2,722
5	B767-300	409,000	3,454
6	B777-300 Baseline	722,000	3,372
7	A300-600	375,000	1,019
8	DC-10-10	458,000	71
9	MD-11	621,000	606
10	B757	250,000	291
11	A320	150.000	24,656
12	B737-800	173,000	26,655
13	B727	172,000	1,346
14	DW-45	45,000	28,229
15	SW-30	22,500	3,808

7.2.1 COMFAA 3.0 Analysis

The top of subgrade k-value = 150 pci. Using the support spreadsheet that accompanies AC 150/5335-5C (FAA, 2014), obtain the equivalent top of subbase k-value:

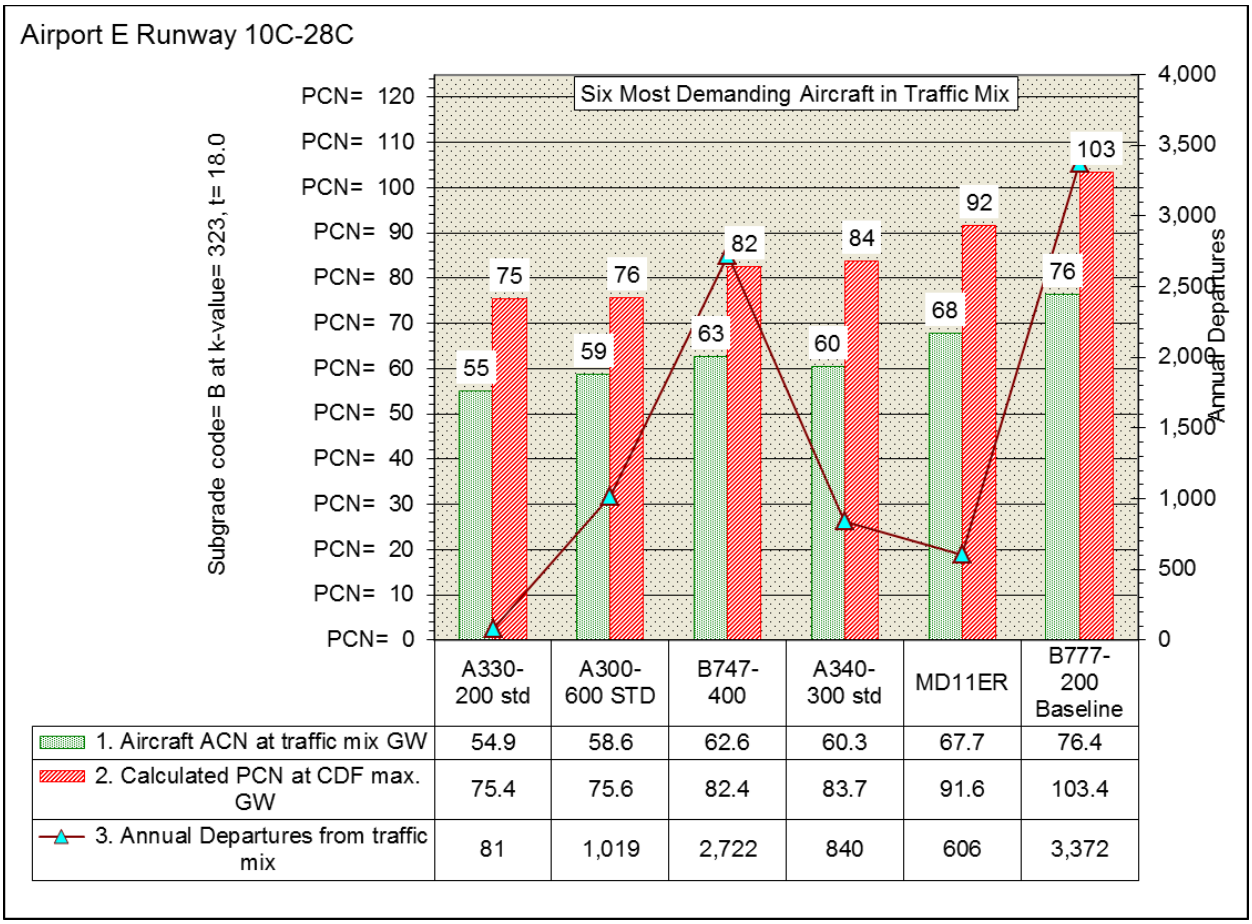
k = 323 pci (subgrade category B)

From COMFAA 3.0, using k = 323 pci, t = 18.0 in., and R = 700 psi, obtain PCN on subgrade strength category B of 103.4, using the B777-200 as reference aircraft. Report PCN as

103/R/B/W/T. (From the available data it is not clear why the AMR reports subgrade category C rather than B.) The COMFAA graphical output is shown in Figure 23.

7.2.2 FAARFIELD 2.0 Analysis

FAARFIELD 2.0 computes PCR using the AC 150/5335-5D method (FAA, 2022). The FAARFIELD structure is shown in Figure 24. FAARFIELD 2.0 computes PCR 1138/R/C/W/T, with the A380 as critical aircraft, which could be reported as PCR 1140/R/C/W/T. The graphical output from FAARFIELD is shown in Figure 25. There are no operating weight restrictions on the aircraft that is used. The complete FAARFIELD PCR results tables are presented in Appendix A.



	A330-200 std	A300-600 STD	B747-400	A340-300 std	MD11ER	B777-200 Baseline
1. Aircraft ACN at traffic mix GW	54.9	58.6	62.6	60.3	67.7	76.4
2. Calculated PCN at CDF max. GW	75.4	75.6	82.4	83.7	91.6	103.4
3. Annual Departures from traffic mix	81	1,019	2,722	840	606	3,372

Figure 23. COMFAA 3.0 Graphic Output, Airport E, Runway 10C-28C

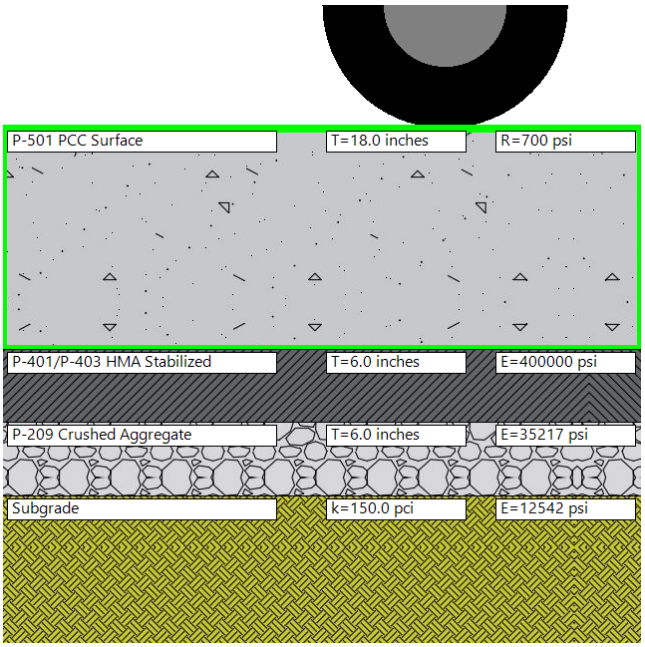


Figure 24. FAARFIELD PCR Evaluation Structure, Airport E, Runway 10C-28C

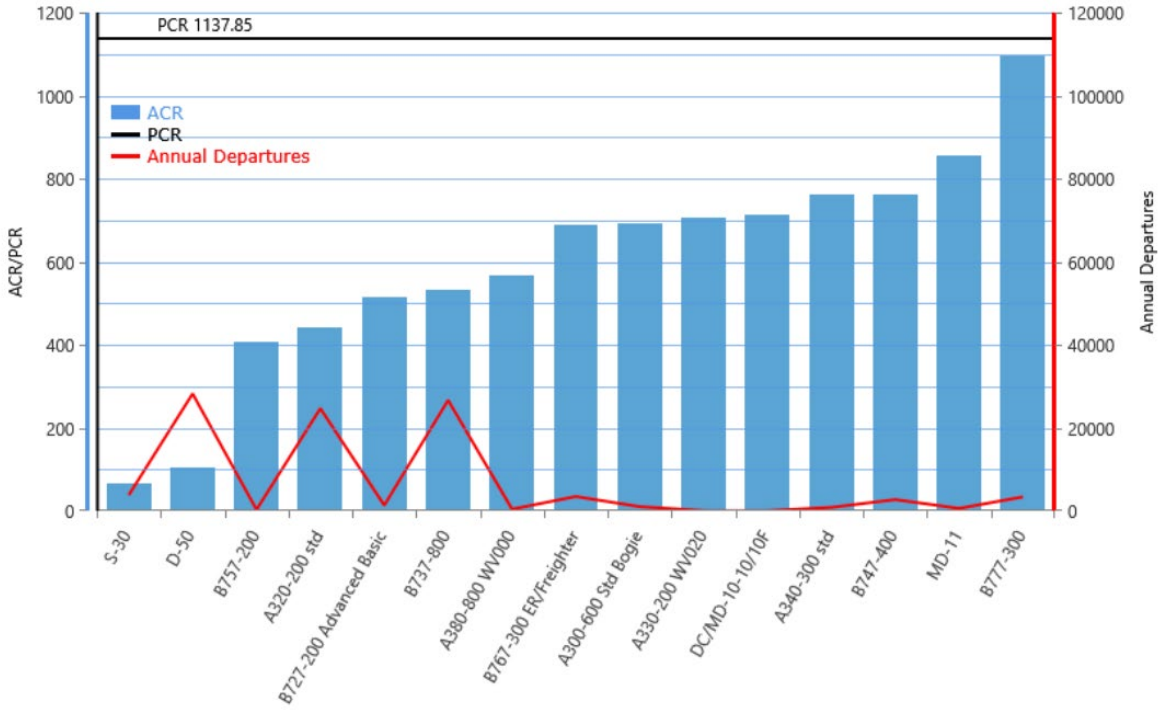


Figure 25. FAARFIELD PCR Graphical Output, Airport E, Runway 10C-28C (Design Traffic)

7.3 AIRPORT G—LARGE HUB

Runway 16L-34R is 12,000 ft long and 150 ft wide. The surface is PCC. The runway was constructed in 1995 and has not received any overlays. The currently reported PCN in the AMR is 92/R/B/W/T.

The rigid pavement section is as follows:

- 17 in. PCC (P-501), R = 775 psi
- 8 in. cement stabilized base (P-304)
- Improved subgrade, k = 160 pci

Table 14 lists the design aircraft traffic. In past ACN/PCN workshops run by the FAA, this example served to illustrate a case where high B737 traffic can drive the PCN calculation, forcing operating weight restrictions on larger aircraft unless there is flexibility allowed in the selection of the reference aircraft.

Table 13. Design Aircraft Traffic for Airport G, Runway 16L-34R

No.	Aircraft	Gross Weight (lb)	Annual Departures
1	DC9-30/40	109,000	8
2	B717-200	122,000	301
3	A318-100 std	124,500	654
4	A319-100 std	142,500	13,002
5	A320-100	151,000	15,280
6	MD80/83/88	161,000	739
7	MD90	168,500	213
8	B727-200 Basic	185,200	111
9	B737-700	188,200	18,133
10	B757-300	271,000	10,079
11	DC8-60/70	358,000	79
12	A300-B4 STD	365,750	831
13	B767-300	413,000	2,521
14	DC10	458,000	115
15	B787-8	478,000	32
16	A330-200 std	509,000	88
17	A340-300 std	608,000	179
18	MD11	633,000	44
19	B747-400	877,000	754
20	A380-800	1,235,000	59
21	B777-200 Baseline	537,000	1,095

7.3.1 COMFAA 3.0 Analysis

The top-of-subgrade *k*-value = 160 pci. Using the support spreadsheet that accompanies AC 150/5335-5C (FAA, 2014), obtain the equivalent top of subbase *k*-value:

k = 323 pci (subgrade category B)

From COMFAA 3.0 analysis, using *k* = 323 pci, *t* = 17.0 in., and flexural strength *R* = 775 psi, obtain PCN on subgrade strength category B of 95.8, using the MD-11 ER as reference aircraft. Report PCN as 96/R/B/W/T. The COMFAA graphical output is shown in Figure 26.

7.3.2 FAARFIELD 2.0 Analysis (As-Built Thickness)

FAARFIELD 2.0 computes PCR using the AC 150/5335-5D method. The FAARFIELD structure is shown in Figure 27. FAARFIELD 2.0 computes PCR 1661/R/C/W/T, with the A380 as critical aircraft, which could be reported as PCR 1660/R/C/W/T. The graphical output from FAARFIELD is shown in Figure 28(a). There are no operating weight restrictions on the using aircraft. The complete FAARFIELD PCR results tables are presented in Appendix A. Based on Figure 28(a), there are no operating weight restrictions on the design aircraft, as all aircraft have much lower ACR. Note that, in the ACR–PCR system, the subgrade is classified as low- (C) rather than medium-strength (B).

7.3.3 FAARFIELD 2.0 (FAARFIELD Design Thickness)

As revealed by the PCR analysis in Section 7.3.2, the as-built runway has considerable excess capacity. For the given inputs, FAARFIELD 2.0 (in design mode) requires a concrete design thickness *t* = 14.4 in. (i.e., 2.5 in. less than as-built). Using the assumed concrete thickness *t* = 14.5 in., obtain PCR 1108/R/C, where the A380 is the critical aircraft. Even at this drastically reduced thickness, there would still be no operating weight restrictions on any of the using aircraft (Figure 28(b)).

This is an example of a case in which including the final step (step 5) in the PCR procedure prevents having to report an unnecessarily low PCR number. The design traffic mix includes a number of very heavy aircraft types, but a high number of departures of a relatively narrow-body aircraft drives the initial section of the critical aircraft. Following the initial evaluation of the full aircraft mix, the aircraft producing the highest CDF contribution is the B737-700. Taking the B737-700 as the critical aircraft, with no further steps, the PCR would be 624/R/C. Reporting such a low PCR would force weight restrictions on all of the larger aircraft that are used. The FAARFIELD PCN procedure avoids this problem by selecting the A380 as the critical aircraft.

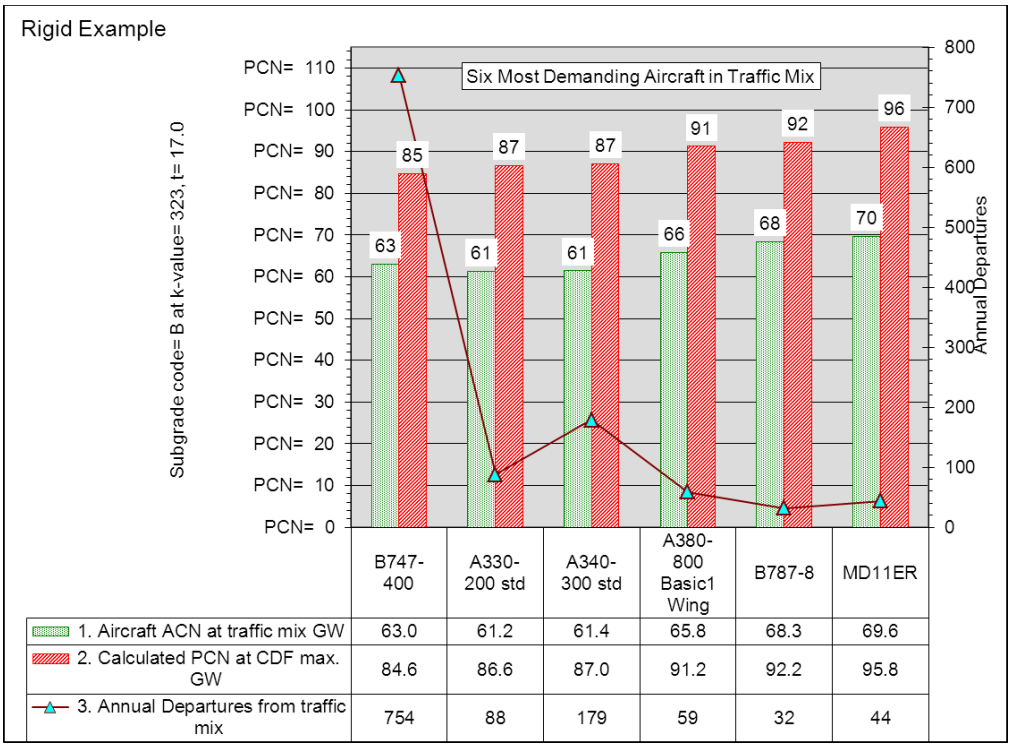


Figure 26. COMFAA 3.0 Graphic Output, Airport G, Runway 16L-34R

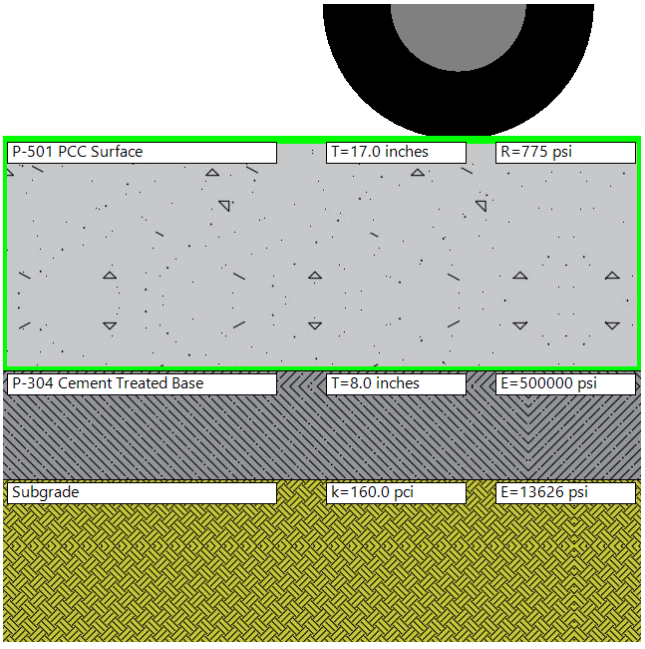
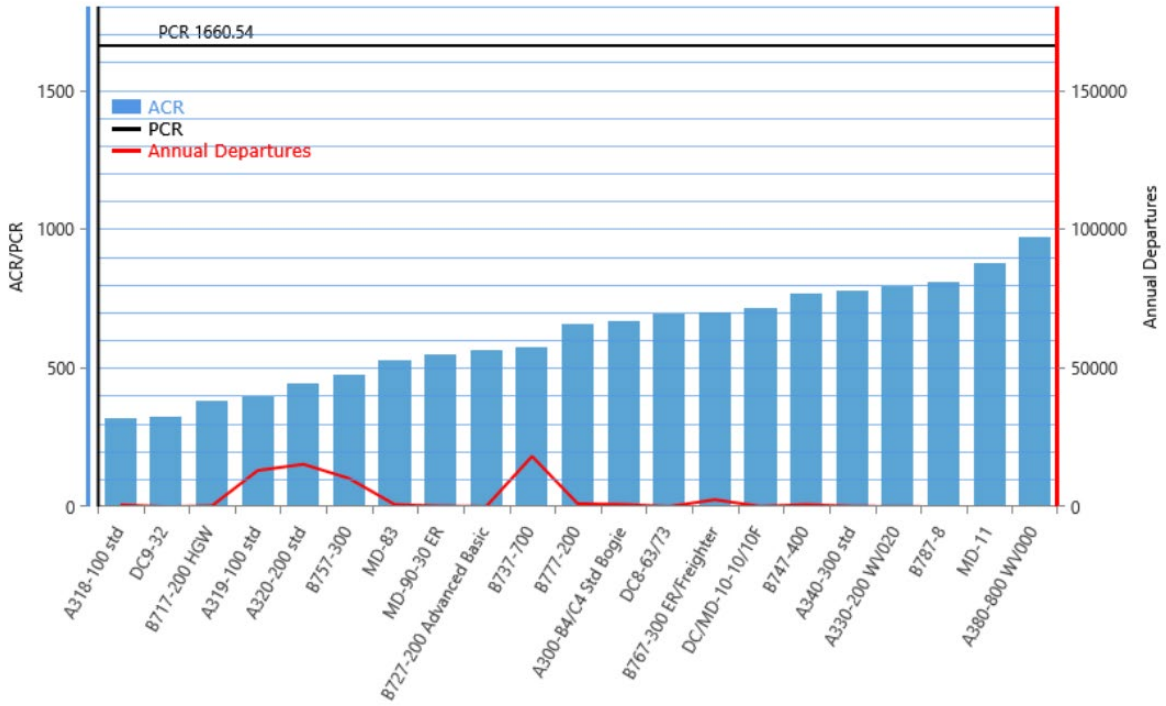
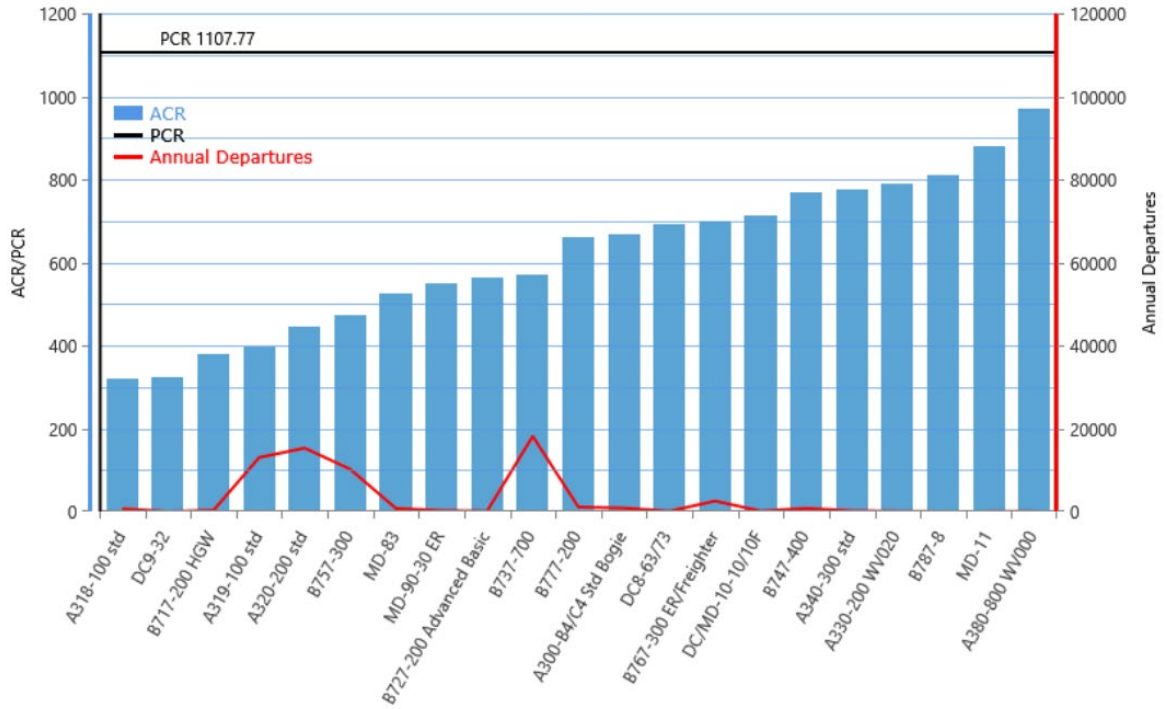


Figure 27. FAARFIELD PCR Evaluation Structure, Airport G, Runway 16L-34R (As-Built Thickness)



(a) As-Built Thickness



(b) FAARFIELD 2.0 Design Thickness

Figure 28. FAARFIELD PCR Graphical Output, Airport G, Runway 16L-34R

7.4 AIRPORT H—MEDIUM HUB

Runway 05R-23L is 10,000 ft long and 150 ft wide. The surface is PCC. The runway was constructed in 1989 and has not received any overlays. The currently reported PCN on the AMR is 93/R/B/W/T. The rigid pavement section consists of 18 in. PCC (P-501) on a 6-in. cement-treated base (P-304).

Table 15 lists the design aircraft traffic.

Table 14. Design Aircraft Traffic for Airport H, Runway 05R-23L

No.	Aircraft	Gross Weight (lb)	Annual Departures
1	B747-400	870,000	67
2	L-1011	483,500	1,809
3	B757-200	230,000	5,335
4	B767-200	357,000	1,509
5	DC-8-70	355,000	2,925
6	B727-200	190,500	7,135
7	B727-100	160,000	3,364
8	DC-9-10	90,700	318
9	DC-9-50	12,1000	3,528
10	MD-88	140,000	2,461
11	B737-300	150,000	5,414
12	B737-100	115,000	887
13	BAC 1-11 400	79,000	176
14	BAe-146-100	93,000	550
15	DHC-8-100	41,100	2,030
16	C130	155,000	441
17	F4	58,000	147

7.4.1 COMFAA 3.0 Analysis

From analysis of heavy-weight deflectometer (HWD) test data using the AREA method (FAA, 2011), estimate the top-of-base *k*-value as 318 pci (subgrade category B). Based on COMFAA 3.0 analysis, using k = 318 pci, t = 18.0 in., and assuming R = 700 psi, obtain PCN on subgrade category B of 91.3, taking the L-1011 as the reference aircraft. Report PCN as 91/R/B/W/T. The COMFAA graphical output is shown in Figure 29.

7.4.2 FAARFIELD 2.0 Analysis

FAARFIELD 2.0 computes PCR using the AC 150/5335-5D method. The FAARFIELD structure is shown in Figure 30. To estimate k at the top of the subgrade, use Figure B-6 in Appendix B of AC 150/5335-5C (FAA, 2014), which yields k (top of subgrade) = 204 pci. FAARFIELD automatically converts this value to E = 18,614 psi. Alternatively, one could perform laboratory tests (e.g., resilient modulus) on samples of subgrade material, or conduct HWD testing to estimate

the in-situ modulus. Using the estimated value E = 18,614 psi (128 MPa), the subgrade remains in the medium strength (B) category. FAARFIELD 2.0 computes PCR 1037/R/B/W/T, with the B747 as critical aircraft, which could be reported as PCR 1040/R/B/W/T. The graphical output from FAARFIELD is shown in Figure 31. There are no operating weight restrictions on any of the aircraft used. The complete FAARFIELD PCR results tables are presented in Appendix A. Based on Figure 35, there are no operating weight restrictions on the design aircraft.

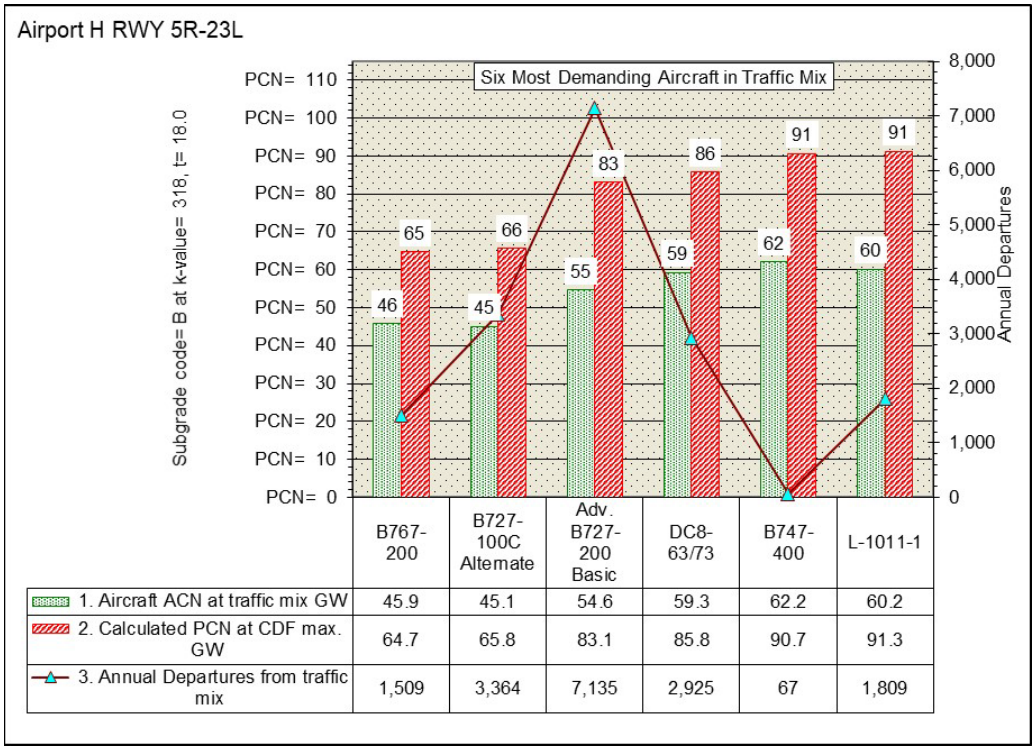


Figure 29. COMFAA 3.0 Graphic Output, Airport H, Runway 5R-23L

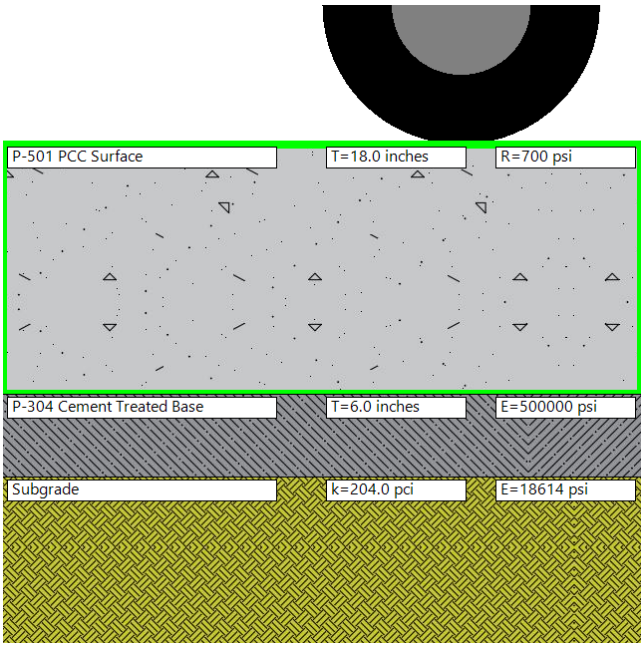


Figure 30. FAARFIELD PCR Evaluation Structure, Airport H, Runway 5R-23L

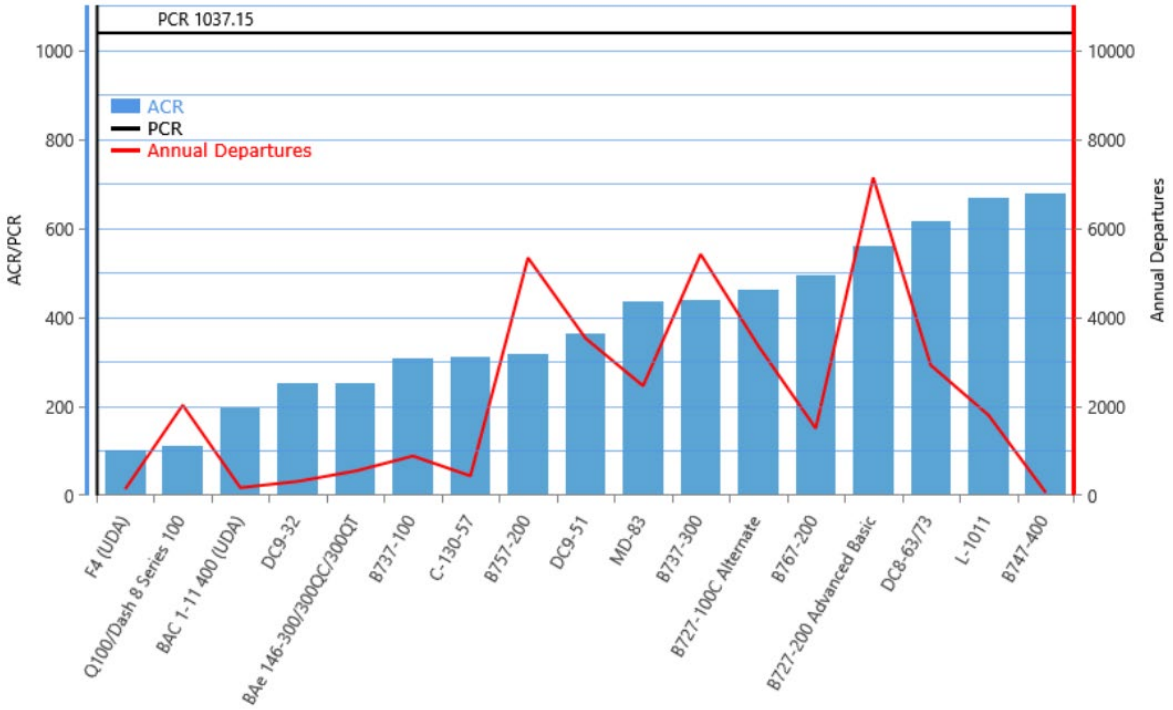


Figure 31. FAARFIELD PCR Graphical Output, Airport H, Runway 5R-23L

7.5 AIRPORT I—INTERNATIONAL

Airport I is located in an Asian country. It has one runway, 17L-35R, which has both flexible and rigid segments. The rigid segment of Runway 17L-35R was analyzed by the Boeing Company using COMFAA 3.0 and assigned a PCN 29/R/A/W/T (Boeing, 2011).

The rigid pavement section is as follows:

- 10.2 in. PCC (P-501), R = 700 psi
- 3.9 in. gravel base (P-209)
- 13.4 in. mixed sand/gravel subbase (P-154)
- Subgrade, k = 440 pci

Table 16 lists the design aircraft traffic.

Table 15. Design Aircraft Traffic for Airport I, Runway 17L-35R

No.	Aircraft	Gross Wt., lbs.	Annual Departures
1	B737	128,600	1,937
2	B737-800	174,700	52
3	B777	657,000	130
4	A319	142,000	52
5	A320	162,900	1,339
6	A320-100	150,800	3,744
7	A330-200	509,000	1,378
8	A330-300	515,700	104
9	B747-8	978,000	365
10	B787-8	503,500	730

7.5.1 FAARFIELD 2.0 (As-Built Thickness)

FAARFIELD 2.0 computes PCR using the AC 150/5335-5D method (FAA, 2022). The FAARFIELD structure is shown in Figure 32. FAARFIELD 2.0 computes PCR 246/R/A/W/T, with the A330-200 as critical aircraft, which could be reported as PCR 250/R/A/W/T. The graphical output from FAARFIELD is shown in Figure 33. The complete FAARFIELD PCR results tables are presented in Appendix A. Based on Figure 33, the section is inadequate for the design aircraft, as all aircraft have higher ACR. This conclusion was also consistent with the Boeing report (FAA, 2011).

7.5.2 FAARFIELD 2.0 (Design Thickness)

As revealed by the PCR analysis in 5.4.1, the as-built runway has insufficient PCC thickness for the design traffic. For the given inputs, FAARFIELD 2.0 produces a concrete design thickness t = 17.2 in. (437 mm) Using an assumed concrete thickness t = 17.3 in. (440 mm), obtain PCR 736/R/A, where the B747-8 is the critical aircraft. The FAARFIELD structure screen is shown in

Figure 34. The complete FAARFIELD PCR results tables are presented in Appendix A and the output PCR chart in Figure 35. At design thickness, there are no operating weight restrictions on any of the aircraft used.

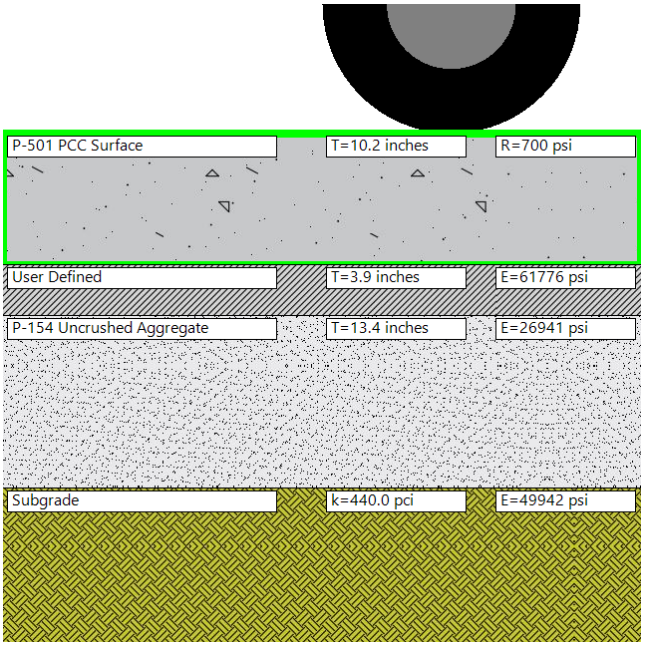


Figure 32. FAARFIELD PCR Evaluation Structure, Airport I, Runway 17L-35R (As-Built)

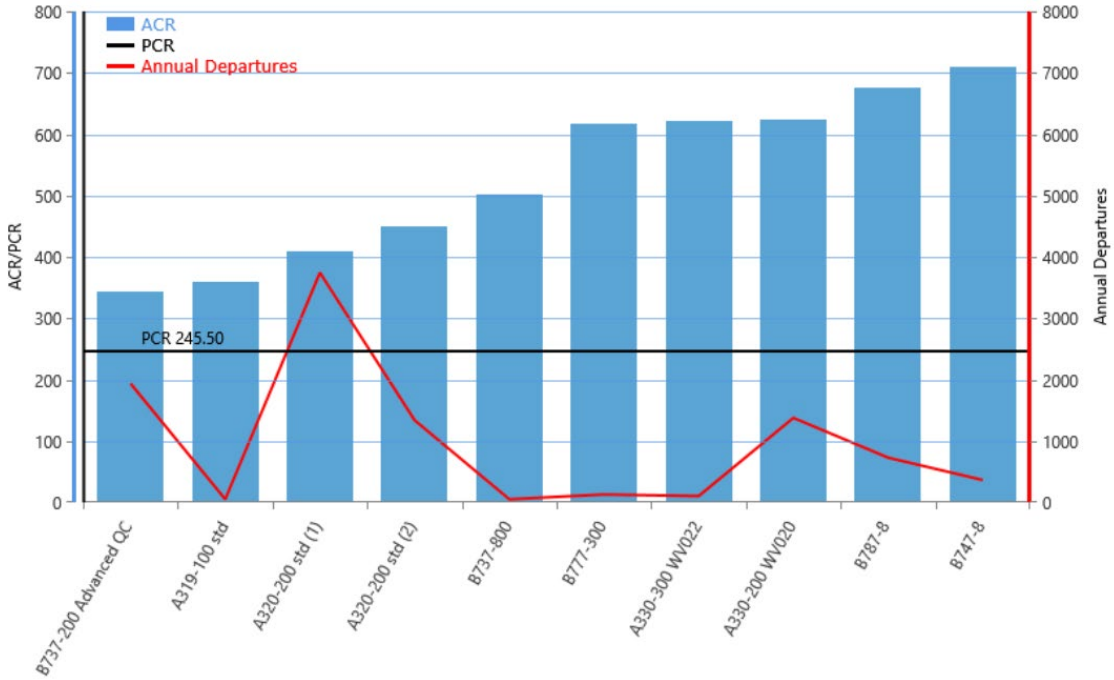


Figure 33. FAARFIELD PCR Graphical Output, Airport I, Runway 17L-35R (As-Built)

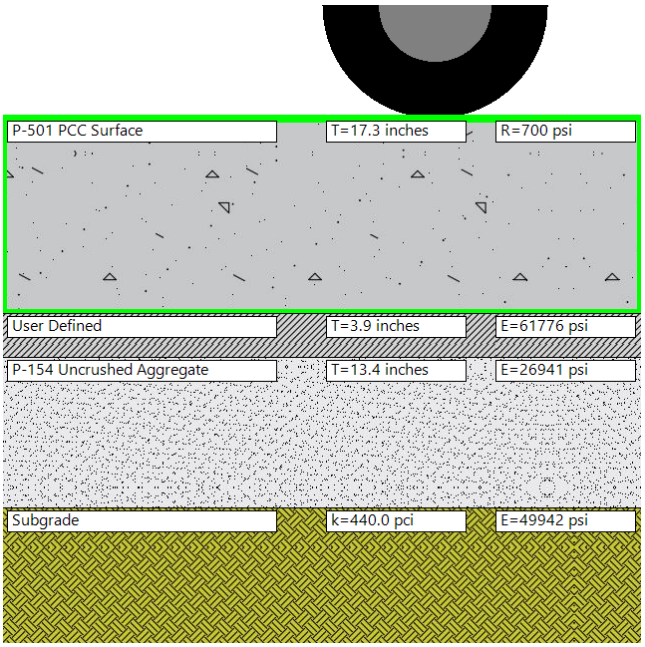


Figure 34. FAARFIELD PCR Evaluation Structure, Airport I, Runway 17L-35R (Design Thickness)

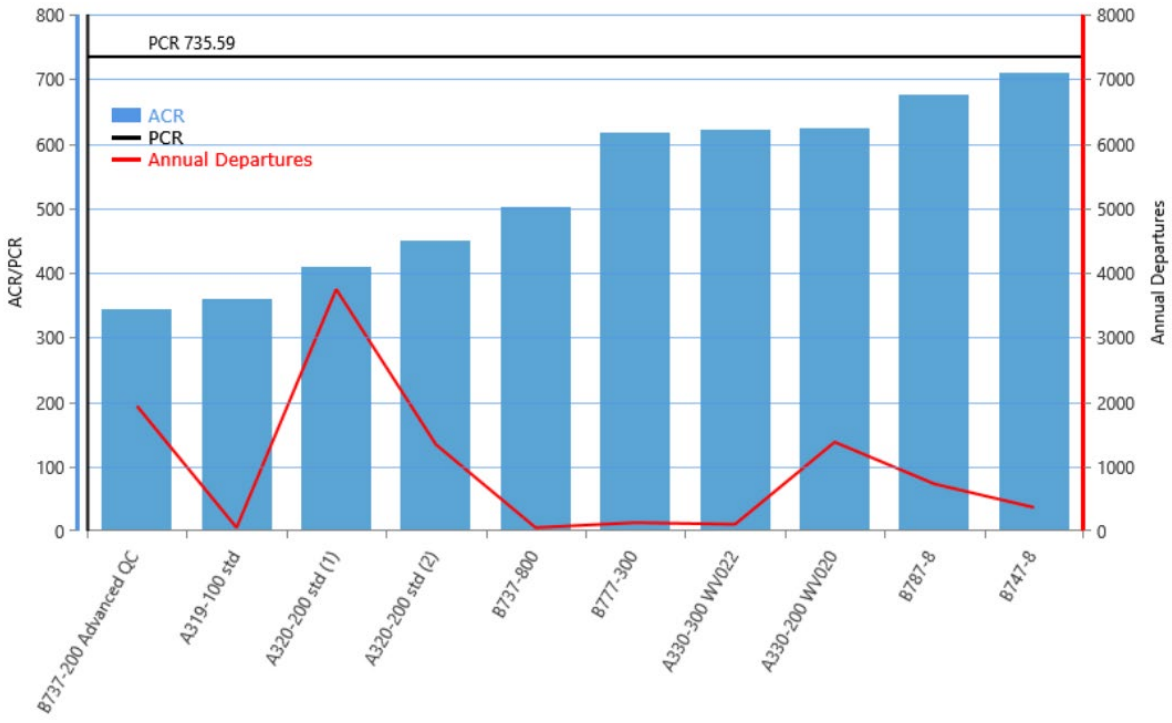


Figure 35. FAARFIELD PCR Graphical Output, Airport I, Runway 17L-35R (Design Thickness)

8. CONCLUSIONS

In anticipation of a requirement to publish PCR for public use paved runways at all 14 CFR Part 139-certificated airports by 2024, the FAA implemented a PCR computational procedure in its FAARFIELD software program. The PCR determined by FAARFIELD can be reported on AMRs. As demonstrated by the preceding examples, FAARFIELD returns a unique value of PCR for a given pavement structure, design life, and aircraft traffic mix. The FAA computed PCR and PCN for ten runways (five flexible and five rigid) where structural and traffic data were available. PCN computations followed the requirements of cancelled AC 150/5335-5C and used computer program COMFAA 3.0. Comparative PCR computations used FAARFIELD 2.0 and followed the requirements of current AC 150/5335-5D.

FAARFIELD 2.0 returned a valid PCR for all five flexible PCR examples. For two of these cases (designated Airport A and Airport F), COMFAA 3.0 failed to return a comparable numerical value for the given inputs; and in both cases, this was because the evaluated structure had considerable excess strength relative to the traffic that used it. In the three cases where COMFAA 3.0 did return a flexible PCN, it was close to the PCN values actually reported in the AMR. In one case (designated Airport F), the evaluated runway was a thick asphalt overlay on rigid pavement, which should be reported as category "F" due to the dominant flexible pavement behavior. None of the considered runways would require operating weight restrictions on the aircraft fleet using it based on either the ACN/PCN or ACR/PCR systems.

Similarly, for all five rigid runway examples, the FAARFIELD-determined PCR was generally comparable to the COMFAA-determined PCN. For the four rigid runways with PCN reported on the AMR, COMFAA determined a value of PCN very close to the AMR value. In two cases (designated Airports D and E), the assigned subgrade category changed from B to C. This is possible because of the different definitions of subgrade strength categories in the ACN/PCN and ACR/PCR systems. In the one case (Airport I) where ACN/PCN analysis found that the section thickness was inadequate to support the design traffic, the ACR/PCR analysis came to the same conclusion.

In certain cases where the numerical value of PCN could be determined by the COMFAA method, the comparable value of PCR was close to 10 times PCN (e.g., Airport B, Runway 10R-28L). However, in other cases, the computed PCR was as low as 8.0 times, or as high as 13.5 times, PCN. In several cases the PCN and PCR numbers were not directly comparable because the subgrade codes were different in the two systems. These comparative results show that it is always necessary to compute PCR using the prescribed methods, and that PCR cannot be evaluated by simple conversion from PCN.

9. REFERENCES

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APPENDIX A—FAARFIELD 2.0 PCR REPORTS

AIRPORT A
RUNWAY 10-28

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2

Section: Airport A RUNWAY 10-28 Extension (as-built)

This file name = PCR Results for HMA on Aggregate 2022-05-20 14:14:18

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Airport A RUNWAY 10-28 Extension (as-built) in job file: PCR Comparisons

2.JOB.xml Units = US Customary

Analysis Type: HMA on Aggregate

Subgrade Modulus =36,500 psi (Subgrade Category is

A) Evaluation Pavement Thickness = 39.0 in.

Pass to Traffic Cycle (PtoTC) Ratio =

1.00 Maximum number of wheels per

gear = 6 CDF = 0.000

At least one aircraft has 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	A300-600 Std Bogie	375,000	95.00	192	1,383	23,680
2	A330-200 WV058	571,000	94.80	223	41	762
3	B767-300 ER/Freighter	409,000	92.40	198	15	267
4	B767-200	335,000	92.40	173	358	6,345
5	A310-300	337,000	94.40	200	303	5,174
6	B777-200 ER	662,000	91.80	206	320	5,733
7	B787-8	502,500	91.40	228	148	2,698
8	A318-100 std	130,100	90.40	155	446	7,600
9	A319-100 std	141,094	92.60	172	5,781	98,343
10	A320-200 std	162,040	93.80	199	10,291	175,093
11	A321-100 std	183,000	95.60	196	702	12,008
12	B717-200 HGW	110,100	94.40	148	15,700	246,725
13	B727-200 Advanced Option	209,000	93.00	172	1,476	25,097
14	B737-300	124,500	90.80	179	14,512	234,973
15	B737-700	171,000	91.80	217	75,464	1,266,132
16	B737-800	171,000	93.60	200	5,804	97,326
17	B737-900	174,200	94.60	203	19	319
18	B757-200	240,000	91.20	172	1,097	18,173
19	B757-300	270,000	92.60	194	2,577	42,792
20	B757-200	250,000	91.20	179	1,810	30,026
21	DC9-32	109,000	92.40	155	260	4,074
22	Learjet 35/36/35A/36A	18,300	95.00	174	1,273	16,245
23	MD-83	150,500	94.80	182	371	5,986
24	D-75	80,500	95.00	118	1,357	20,627
25	D-100	103,593	95.00	145	8,687	134,349
26	D-75	72,500	95.00	106	17,360	262,507
27	D-50	53,000	95.00	85	16,384	245,620

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
28	D-30	34,500	95.00	98	7,555	104,412
29	S-5	5,500	95.00	55	1,200	12,929
30	S-10	8,750	95.00	44	2,820	31,311
31	S-5	4,750	95.00	48	266	2,842

Results Table 2. PCR Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max. Allowable Gross Weight of critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/F/A
1	A330-200 WV058	41	2,873,867	61.2	6616.9

Results Table 3. Hot-Mix Asphalt on Aggregate ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (A)	ACR/F/A
1	A300-600 Std Bogie	375,000	95.00	192	17.3	418.4
2	A330-200 WV058	571,000	94.80	223	20.8	626.7
3	B767-300 ER/Freighter	409,000	92.40	198	17.7	437
4	B767-200	335,000	92.40	173	15.8	348.6
5	A310-300	337,000	94.40	200	16.2	365.2
6	B777-200 ER	662,000	91.80	206	18.0	474.1
7	B787-8	502,500	91.40	228	19.6	549.3
8	A318-100 std	130,100	90.40	155	13.0	235.3
9	A319-100 std	141,094	92.60	172	14.2	279.1

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (A)	ACR/F/A
10	A320-200 std	162,040	93.80	199	15.7	343.2
11	A321-100 std	183,000	95.60	196	16.9	397.3
12	B717-200 HGW	110,100	94.40	148	12.8	225.6
13	B727-200 Advanced Option	209,000	93.00	172	17.6	434.1
14	B737-300	124,500	90.80	179	13.6	256.8
15	B737-700	171,000	91.80	217	16.0	357.1
16	B737-800	171,000	93.60	200	16.3	368.7
17	B737-900	174,200	94.60	203	16.5	380.7
18	B757-200	240,000	91.20	172	13.3	246
19	B757-300	270,000	92.60	194	14.4	289.3
20	B757-200	250,000	91.20	179	13.6	256.8
21	DC9-32	109,000	92.40	155	12.5	215.5
22	Learjet 35/36/35A/36A	18,300	95.00	174	4.7	37.1
23	MD-83	150,500	94.80	182	15.5	334
24	D-75	80,500	95.00	118	10.0	139.2
25	D-100	103,593	95.00	145	12.2	205.6
26	D-75	72,500	95.00	106	9.4	123.6
27	D-50	53,000	95.00	85	6.7	67
28	D-30	34,500	95.00	98	5.5	47.2
29	S-5	5,500	95.00	55	4.6	15.2
30	S-10	8,750	95.00	44	4.6	20.1
31	S-5	4,750	95.00	48	4.6	13.7

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2

Section: Airport A RUNWAY 10-28 Extension (design)

This file name = PCR Results for HMA on Aggregate 2022-05-20 14:26:47

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Airport A RUNWAY 10-28 Extension (design) in job file: PCR Comparisons 2.JOB.xml

Units = US Customary

Analysis Type: HMA on Aggregate

Subgrade Modulus =36,500 psi (Subgrade Category is A)

Evaluation Pavement Thickness = 16.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.440

At least one aircraft has 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	A300-600 Std Bogie	375,000	95.00	192	1,383	17,709
2	A330-200 WV058	571,000	94.80	223	41	462
3	B767-300 ER/Freighter	409,000	92.40	198	15	177
4	B767-200	335,000	92.40	173	358	4,092
5	A310-300	337,000	94.40	200	303	3,819
6	B777-200 ER	662,000	91.80	206	320	3,370
7	B787-8	502,500	91.40	228	148	1,650
8	A318-100 std	130,100	90.40	155	446	5,544
9	A319-100 std	141,094	92.60	172	5,781	71,114
10	A320-200 std	162,040	93.80	199	10,291	126,764
11	A321-100 std	183,000	95.60	196	702	8,931
12	B717-200 HGW	110,100	94.40	148	15,700	194,244
13	B727-200 Advanced Option	209,000	93.00	172	1,476	20,156
14	B737-300	124,500	90.80	179	14,512	176,746
15	B737-700	171,000	91.80	217	75,464	957,226
16	B737-800	171,000	93.60	200	5,804	73,398
17	B737-900	174,200	94.60	203	19	242
18	B757-200	240,000	91.20	172	1,097	13,104
19	B757-300	270,000	92.60	194	2,577	31,200
20	B757-200	250,000	91.20	179	1,810	21,791
21	DC9-32	109,000	92.40	155	260	3,192
22	Learjet 35/36/35A/36A	18,300	95.00	174	1,273	10,495
23	MD-83	150,500	94.80	182	371	4,810
24	D-75	80,500	95.00	118	1,357	15,744
25	D-100	103,593	95.00	145	8,687	104,125
26	D-75	72,500	95.00	106	17,360	199,436
27	D-50	53,000	95.00	85	16,384	185,177

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
28	D-30	34,500	95.00	98	7,555	73,429
29	S-5	5,500	95.00	55	1,200	6,962
30	S-10	8,750	95.00	44	2,820	17,502
31	S-5	4,750	95.00	48	266	1,514

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/F/A
1	A330-200 WV058	92	634,434	21.7	699.5

Results Table 3. Hot-Mix Asphalt on Aggregate ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (A)	ACR/F/A
1	A300-600 Std Bogie	375,000	95.00	192	17.3	418.4
2	A330-200 WV058	571,000	94.80	223	20.8	626.7
3	B767-300 ER/Freighter	409,000	92.40	198	17.7	437
4	B767-200	335,000	92.40	173	15.8	348.6
5	A310-300	337,000	94.40	200	16.2	365.2
6	B777-200 ER	662,000	91.80	206	18.0	474.1
7	B787-8	502,500	91.40	228	19.6	549.3
8	A318-100 std	130,100	90.40	155	13.0	235.3
9	A319-100 std	141,094	92.60	172	14.2	279.1

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (A)	ACR/F/A
10	A320-200 std	162,040	93.80	199	15.7	343.2
11	A321-100 std	183,000	95.60	196	16.9	397.3
12	B717-200 HGW	110,100	94.40	148	12.8	225.6
13	B727-200 Advanced Option	209,000	93.00	172	17.6	434.1
14	B737-300	124,500	90.80	179	13.6	256.8
15	B737-700	171,000	91.80	217	16.0	357.1
16	B737-800	171,000	93.60	200	16.3	368.7
17	B737-900	174,200	94.60	203	16.5	380.7
18	B757-200	240,000	91.20	172	13.3	246
19	B757-300	270,000	92.60	194	14.4	289.3
20	B757-200	250,000	91.20	179	13.6	256.8
21	DC9-32	109,000	92.40	155	12.5	215.5
22	Learjet 35/36/35A/36A	18,300	95.00	174	4.7	37.1
23	MD-83	150,500	94.80	182	15.5	334
24	D-75	80,500	95.00	118	10.0	139.2
25	D-100	103,593	95.00	145	12.2	205.6
26	D-75	72,500	95.00	106	9.4	123.6
27	D-50	53,000	95.00	85	6.7	67
28	D-30	34,500	95.00	98	5.5	47.2
29	S-5	5,500	95.00	55	4.6	15.2
30	S-10	8,750	95.00	44	4.6	20.1
31	S-5	4,750	95.00	48	4.6	13.7

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2

Section: Airport B RUNWAY 10L-28R

This file name = PCR Results for New Flexible 2022-05-19 16:03:26

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Airport B RUNWAY 10L-28R in job file: PCR Comparisons

2.JOB.xml Units = US Customary

Analysis Type: New Flexible

Subgrade Modulus =11,000 psi (Subgrade Category is

C) Evaluation Pavement Thickness = 27.8 in.

Pass to Traffic Cycle (PtoTC) Ratio =

1.00 Maximum number of wheels per

gear = 6 CDF = 0.700

At least one aircraft has 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-10	10,000	95.00	50	1	11
2	D-30	30,000	95.00	85	3	43
3	CRJ100/200	47,450	93.00	159	2,909	42,407
4	ERJ-145 XR	53,131	95.00	174	7,546	112,274
5	Q400/Dash 8 Series 400	60,198	93.00	211	742	11,135
6	CRJ700	72,500	95.00	141	1,461	24,276
7	Gulfstream-G-IV	74,600	95.00	184	2	29
8	CRJ900	80,500	95.00	153	218	3,617
9	EMB-175 STD	89,000	95.00	146	4,328	75,459
10	B737-200	128,600	92.80	175	9	162
11	EMB-190 STD	114,000	95.00	159	60	1,113
12	B717-200 HGW	121,000	94.40	163	874	14,982
13	DC9-51	122,000	94.00	172	60	1,026
14	B737-500	134,000	92.20	194	138	2,465
15	B737-300	140,000	90.80	201	1,691	30,193
16	A319-100 std	145,505	92.60	177	895	17,018
17	B737-400	150,500	93.80	185	10	180
18	B737-700	154,500	91.80	196	2,789	51,711
19	MD-83	161,000	94.80	195	1,339	23,734
20	MD-90-30 ER	168,500	94.00	193	100	1,777
21	B737-800	174,700	93.60	204	433	8,072
22	A321-100 std	183,000	95.60	196	1	19
23	B737-900	188,200	94.60	220	1	19
24	B727-200 Advanced Option	209,500	93.00	173	1	19
25	B757-200	256,000	91.20	183	67	1,231
26	B767-200 ER	396,000	90.80	190	1	19

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
27	C-17A	585,000	95.00	138	233	5,385
28	S-3	3,000	95.00	50	579	5,118
29	S-5	5,000	95.00	50	2,314	21,245
30	D-15	10,000	95.00	37	165	1,925
31	D-20	20,000	95.00	65	661	8,107
32	D-30	30,000	95.00	85	2,892	37,591

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/F/C
1	C-17A	444	598,037	27.8	571.9

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

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
1	S-10	10,000	95.00	50	6.4	30.3
2	D-30	30,000	95.00	85	10.3	67
3	CRJ100/200	47,450	93	159	14.0	118.4
4	ERJ-145 XR	53,131	95.00	174	15.2	138.9
5	Q400/Dash 8 Series 400	60,198	93	211	16.1	155.6
6	CRJ700	72,500	95	141	16.8	170.2
7	Gulfstream-G-IV	74,600	95.00	184	20.1	255.4
8	CRJ900	80,500	95	153	18.0	196.2

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
9	EMB-175 STD	89,000	95.00	146	18.4	205.3
10	B737-200	128,600	92.80	175	21.6	310.2
11	EMB-190 STD	114,000	95.00	159	20.2	260.7
12	B717-200 HGW	121,000	94.40	163	22.0	325.6
13	DC9-51	122,000	94.00	172	22.1	328.4
14	B737-500	134,000	92.20	194	22.2	332.3
15	B737-300	140,000	90.80	201	22.5	346.4
16	A319-100 std	145,505	92.60	177	22.3	336.5
17	B737-400	150,500	93.80	185	23.8	394.5
18	B737-700	154,500	91.80	196	23.2	375.3
19	MD-83	161,000	94.80	195	25.5	463.3
20	MD-90-30 ER	168,500	94.00	193	26.1	487.5
21	B737-800	174,700	93.60	204	25.2	448.9
22	A321-100 std	183,000	95.60	196	25.7	472.5
23	B737-900	188,200	94.60	220	26.4	501.1
24	B727-200 Advanced Option	209,500	93.00	173	27.7	557.5
25	B757-200	256,000	91.20	183	22.3	338.7
26	B767-200 ER	396,000	90.80	190	26.6	508.7
27	C-17A	585,000	95.00	138	27.4	553
28	S-3	3,000	95.00	50	4.6	10.5
29	S-5	5,000	95.00	50	4.6	15.7
30	D-15	10,000	95.00	37	4.6	17.6
31	D-20	20,000	95.00	65	8.2	44.8
32	D-30	30,000	95.00	85	10.3	67

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2

Section: Airport B RUNWAY 10L-28R Extensions

This file name = PCR Results for HMA on Aggregate 2022-05-19 16:13:03

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Airport B RUNWAY 10L-28R Extensions in job file: PCR Comparisons 2.JOB.xml Units = US Customary

Analysis Type: HMA on Aggregate

Subgrade Modulus =11,000 psi (Subgrade Category is C) Evaluation Pavement Thickness = 40.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00 Maximum number of wheels per gear = 6 CDF = 0.000

At least one aircraft has 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	S-10	10,000	95.00	50	1	14
2	D-30	30,000	95.00	85	3	50
3	CRJ100/200	47,450	93.00	159	2,909	49,445
4	ERJ-145 XR	53,131	95.00	174	7,546	130,291
5	Q400/Dash 8 Series 400	60,198	93.00	211	742	12,883
6	CRJ700	72,500	95.00	141	1,461	27,282
7	Gulfstream-G-IV	74,600	95.00	184	2	34
8	CRJ900	80,500	95.00	153	218	4,067
9	EMB-175 STD	89,000	95.00	146	4,328	83,604
10	B737-200	128,600	92.80	175	9	178
11	EMB-190 STD	114,000	95.00	159	60	1,211
12	B717-200 HGW	121,000	94.40	163	874	16,673
13	DC9-51	122,000	94.00	172	60	1,142
14	B737-500	134,000	92.20	194	138	2,712
15	B737-300	140,000	90.80	201	1,691	33,218
16	A319-100 std	145,505	92.60	177	895	18,387
17	B737-400	150,500	93.80	185	10	198
18	B737-700	154,500	91.80	196	2,789	56,276
19	MD-83	161,000	94.80	195	1,339	26,177
20	MD-90-30 ER	168,500	94.00	193	100	1,959
21	B737-800	174,700	93.60	204	433	8,770
22	A321-100 std	183,000	95.60	196	1	21
23	B737-900	188,200	94.60	220	1	20
24	B727-200 Advanced Option	209,500	93.00	173	1	21
25	B757-200	256,000	91.20	183	67	1,343
26	B767-200 ER	396,000	90.80	190	1	21

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
27	C-17A	585,000	95.00	138	233	5,467
28	S-3	3,000	95.00	50	579	6,776
29	S-5	5,000	95.00	50	2,314	27,775
30	D-15	10,000	95.00	37	165	2,335
31	D-20	20,000	95.00	65	661	9,688
32	D-30	30,000	95.00	85	2,892	44,165

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/F/C
1	C-17A	233	936,975	38.4	1217.8

Results Table 3. Hot-Mix Asphalt on Aggregate ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
1	S-10	10,000	95.00	50	6.4	30.3
2	D-30	30,000	95.00	85	10.3	67
3	CRJ100/200	47,450	93	159	14.0	118.4
4	ERJ-145 XR	53,131	95.00	174	15.2	138.9
5	Q400/Dash 8 Series 400	60,198	93	211	16.1	155.6
6	CRJ700	72,500	95	141	16.8	170.2
7	Gulfstream-G-IV	74,600	95.00	184	20.1	255.4
8	CRJ900	80,500	95	153	18.0	196.2

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
9	EMB-175 STD	89,000	95.00	146	18.4	205.3
10	B737-200	128,600	92.80	175	21.6	310.2
11	EMB-190 STD	114,000	95.00	159	20.2	260.7
12	B717-200 HGW	121,000	94.40	163	22.0	325.6
13	DC9-51	122,000	94.00	172	22.1	328.4
14	B737-500	134,000	92.20	194	22.2	332.3
15	B737-300	140,000	90.80	201	22.5	346.4
16	A319-100 std	145,505	92.60	177	22.3	336.5
17	B737-400	150,500	93.80	185	23.8	394.5
18	B737-700	154,500	91.80	196	23.2	375.3
19	MD-83	161,000	94.80	195	25.5	463.3
20	MD-90-30 ER	168,500	94.00	193	26.1	487.5
21	B737-800	174,700	93.60	204	25.2	448.9
22	A321-100 std	183,000	95.60	196	25.7	472.5
23	B737-900	188,200	94.60	220	26.4	501.1
24	B727-200 Advanced Option	209,500	93.00	173	27.7	557.5
25	B757-200	256,000	91.20	183	22.3	338.7
26	B767-200 ER	396,000	90.80	190	26.6	508.7
27	C-17A	585,000	95.00	138	27.4	553
28	S-3	3,000	95.00	50	4.6	10.5
29	S-5	5,000	95.00	50	4.6	15.7
30	D-15	10,000	95.00	37	4.6	17.6
31	D-20	20,000	95.00	65	8.2	44.8
32	D-30	30,000	95.00	85	10.3	67

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2

Section: Airport B RUNWAY 10R-28L

This file name = PCR Results for New Flexible 2022-05-19 16:18:48

Evaluation pavement type is flexible and design program is FAARFIELD.

Section name: Airport B RUNWAY 10R-28L in job file: PCR Comparisons

2.JOB.xml Units = US Customary

Analysis Type: New Flexible

Subgrade Modulus =10,500 psi (Subgrade Category

is C) Evaluation Pavement Thickness = 28.0 in.

Pass to Traffic Cycle (PtoTC) Ratio =

1.00 Maximum number of wheels per

gear = 4 CDF = 0.000

At least one aircraft has 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	B767-300	317,000	92.40	176	365	5,652
2	B757-200	256,000	91.20	183	1,360	20,870
3	B737-900	188,200	94.60	220	1,360	21,261
4	B737-800	174,700	93.60	204	4,380	68,176
5	MD-83	161,000	94.80	195	365	5,404
6	B737-400	150,500	93.80	185	365	5,498
7	B737-300	140,000	90.80	201	17,885	266,731
8	B737-500	134,000	92.20	194	2,920	43,563
9	B717-200 HGW	122,000	94.40	164	35,310	505,950
10	CRJ900	84,500	95.00	161	6,570	91,337
11	CRJ700	75,000	95.00	146	18,615	258,967
12	ERJ-145 ER	48,500	95.00	154	32,405	405,384
13	S-10	8,750	95.00	44	550	4,861
14	S-3	2,300	95.00	38	600	4,776
15	D-30	30,000	95.00	85	6,525	77,404
16	S-10	10,000	95.00	50	15,225	136,426
17	D-50	50,000	95.00	80	40,400	537,250

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lb)	ACR Thick at max. MGW (in.)	PCR/F/C
1	B737-900	1,360	259,701	31.8	775.3

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

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/F/C
1	B767-300	317,000	92.40	176	23.5	384.1
2	B757-200	256,000	91.20	183	22.3	338.7
3	B737-900	188,200	94.60	220	26.4	501.1
4	B737-800	174,700	93.60	204	25.2	448.9
5	MD-83	161,000	94.80	195	25.5	463.3
6	B737-400	150,500	93.80	185	23.8	394.5
7	B737-300	140,000	90.80	201	22.5	346.4
8	B737-500	134,000	92.20	194	22.2	332.3
9	B717-200 HGW	122,000	94.40	164	22.1	329.5
10	CRJ900	84,500	95	161	18.5	208.4
11	CRJ700	75,000	95	146	17.2	177.2
12	ERJ-145 ER	48,500	95.00	154	14.2	121.5
13	S-10	8,750	95.00	44	5.8	26.3
14	S-3	2,300	95.00	38	4.6	8.4
15	D-30	30,000	95.00	85	10.3	67
16	S-10	10,000	95.00	50	6.4	30.3
17	D-50	50,000	95.00	80	13.3	108.1

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2
Section: Airport C RUNWAY 01-19
This file name = PCR Results for HMA on Aggregate 2022-05-20 14:33:52

Evaluation pavement type is flexible and design program is FAARFIELD. Section

name: Airport C RUNWAY 01-19 in job file: PCR Comparisons 2.JOB.xml Units =

US Customary

Analysis Type: HMA on Aggregate
Subgrade Modulus =15,000 psi (Subgrade Category is B)

Evaluation Pavement Thickness = 27.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 4

CDF = 0.000

At least one aircraft has 4 or more wheels per gear.

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	CRJ100ER/200ER	51,000	93.00	172	6,169	74,640
2	CRJ700	71,000	95.00	138	2,210	30,480
3	ERJ-145 ER	42,300	95.00	134	15,675	193,231
4	EMB-170 STD	85,100	95.00	135	5,626	81,683
5	EMB-190 STD	114,200	95.00	159	6,661	102,748
6	B717-200 HGW	121,000	94.40	163	7,493	106,761
7	B737-300	140,000	90.80	201	3,330	49,435
8	B737-700	153,500	91.80	195	10,032	154,638
9	B737-800	173,000	93.60	202	7,524	116,587
10	B737-900	174,200	94.60	203	209	3,241
11	MD-83	140,000	94.80	170	5,706	83,404
12	A319-100 opt	154,300	91.40	185	14,986	237,021
13	A320-200 std	162,000	93.80	199	10,407	164,395
14	A321-100 std	181,200	95.60	194	1,249	19,869
15	B757-200	240,000	91.20	172	8,031	122,354
16	B767-300	345,000	92.40	191	207	3,208

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/F/B
1	A321-100 std	1,249	263,373	26.1	677.4

Results Table 3. Hot-Mix Asphalt on Aggregate ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (B)	ACR/F/B
1	CRJ100ER/200ER	51,000	93	172	11.7	118.2
2	CRJ700	71,000	95	138	13.3	151.7
3	ERJ-145 ER	42,300	95.00	134	10.2	91.9
4	EMB-170 STD	85,100	95.00	135	14.2	173.9
5	EMB-190 STD	114,200	95.00	159	16.7	239.9
6	B717-200 HGW	121,000	94.40	163	18.2	285.7
7	B737-300	140,000	90.80	201	18.9	313.8
8	B737-700	153,500	91.80	195	19.6	341.6
9	B737-800	173,000	93.60	202	21.0	405.7
10	B737-900	174,200	94.60	203	21.2	414.5
11	MD-83	140,000	94.80	170	19.6	341.6
12	A319-100 opt	154,300	91.40	185	19.3	330.1
13	A320-200 std	162,000	93.80	199	20.2	365.6
14	A321-100 std	181,200	95.60	194	21.4	424.2
15	B757-200	240,000	91.20	172	17.7	268.9
16	B767-300	345,000	92.40	191	20.6	386.1

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2

Section: Airport D RUNWAY 10R-28L
This file name = PCR Results for New Rigid 2022-05-23 14:11:52 Evaluation

pavement type is rigid and design program is FAARFIELD.

Section name: Airport D RUNWAY 10R-28L in job file: PCR Comparisons 2.JOB.xml

Units = US Customary

Analysis Type: New Rigid
Subgrade Modulus =19,500 psi (Subgrade Category is B)

Evaluation Pavement Thickness = 22.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.020

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	A300-600 Std Bogie	380,518	95.00	194	48	395
2	A310-200	315,041	93.20	193	22	30
3	A310-300	315,041	94.40	187	16	22
4	A318-100 std	124,341	90.40	148	9,531	55,394
5	A320-200 std	162,922	93.80	200	8,505	70,884
6	A321-100 std	183,866	95.60	197	1,895	17,295
7	A330-200 WV020	509,047	94.80	228	7	141
8	A330-300 WV020	509,047	95.80	206	23	491
9	A380-800 WV000	1,239,000	38.00	218	12	63
10	A380-800 WV000 Belly	1,239,000	57.00	218	12	57
11	B727-200 Advanced Basic	185,200	96.00	148	28	48
12	B737-200 Advanced QC	128,600	92.00	182	97	126
13	B717-200 HGW	122,000	94.40	164	415	580
14	B737-300	140,000	90.80	201	571	735
15	B737-400	150,500	93.80	185	381	538
16	B737-500	134,000	92.20	194	74	96
17	B737-700	155,000	91.80	197	9,055	71,396
18	B737-800	174,700	93.60	204	3,310	28,792
19	B737-900	174,700	94.60	204	631	6,927
20	B747-400ER	913,000	46.80	230	2	22
21	B747-400ER Belly	913,000	46.80	230	2	22
22	B757-200	256,000	91.20	183	816	3,009
23	B757-300	273,500	92.60	197	247	1,134
24	B767-200 ER	396,000	90.80	190	12	16
25	B767-300 ER/Freighter	413,000	92.40	200	125	572
26	B767-400 ER	451,000	94.00	215	28	308
27	B777-200 ER	658,000	91.80	205	18	175

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
28	B787-8	486,000	91.40	220	138	1,412
29	C-130	155,000	95.00	105	182	660
30	DC/MD-10-10/10F	458,000	93.40	195	159	869
31	D-100	100,000	95.00	140	2,100	18,020
32	D-20	20,000	95.00	65	6,263	28,126
33	D-30	30,000	95.00	85	1,858	8,854
34	D-50	45,000	95.00	72	744	6,746
35	D-75	75,000	95.00	110	91	924
36	MD-11	633,000	77.60	206	30	163
37	MD-11 Belly	633,000	17.00	180	30	199
38	MD-83	161,000	94.80	195	527	770
39	MD-90-30 ER	168,500	94.00	193	42	63
40	CRJ100/200	47,450	93.00	159	1,257	9,267
41	CRJ700	72,500	95.00	141	616	3,623

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max. Allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/R/B
1	A380-800 WV000	195	1,423,895	18.5	1036.1

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

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)
1	A300-600 Std Bogie	380,518	95.00	194
2	A310-200	315,041	93.20	193
3	A310-300	315,041	94.40	187
4	A318-100 std	124,341	90.40	148
5	A320-200 std	162,922	93.80	200
6	A321-100 std	183,866	95.60	197
7	A330-200 WV020	509,047	94.80	228
8	A330-300 WV020	509,047	95.80	206
9	A380-800 WV000	1,239,000	95	218
10	B727-200 Advanced Basic	185,200	96.00	148
11	B737-200 Advanced QC	128,600	92.00	182
12	B717-200 HGW	122,000	94.40	164
13	B737-300	140,000	90.80	201
14	B737-400	150,500	93.80	185
15	B737-500	134,000	92.20	194
16	B737-700	155,000	91.80	197
17	B737-800	174,700	93.60	204
18	B737-900	174,700	94.60	204
19	B747-400ER	913,000	93.6	230
20	B757-200	256,000	91.20	183
21	B757-300	273,500	92.60	197
22	B767-200 ER	396,000	90.80	190
23	B767-300 ER/Freighter	413,000	92.40	200
24	B767-400 ER	451,000	94.00	215
25	B777-200 ER	658,000	91.80	205
26	B787-8	486,000	91.40	220
27	C-130	155,000	95.00	105

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)
28	DC/MD-10-10/10F	458,000	93.40	195
29	D-100	100,000	95.00	140
30	D-20	20,000	95.00	65
31	D-30	30,000	95.00	85
32	D-50	45,000	95.00	72
33	D-75	75,000	95.00	110
34	MD-11	633,000	94.60001	206
35	MD-83	161,000	94.80	195
36	MD-90-30 ER	168,500	94.00	193
37	CRJ100/200	47,450	93	159
38	CRJ700	72,500	95	141

Results Table 3. Continued

No.	Aircraft Name	(A)	(B)	(C)	(D)	ACR/A	ACR/B	ACR/C	ACR/D
1	A300-600 Std Bogie	7.2	7.9	8.4	9	538.1	633.2	705.6	783.1
2	A310-200	7.2	7.9	8.4	9	395.1	464.6	522.7	586.4
3	A310-300	7.2	7.9	8.4	9	398.2	470	529.7	594.8
4	A318-100 std	7.2	7.9	8.4	9	281.4	302.8	318.4	334
5	A320-200 std	7.2	7.9	8.4	9	448.6	470.3	485.7	501.5
6	A321-100 std	7.2	7.9	8.4	9	528.2	553	570.3	588.6
7	A330-200 WV020	7.2	7.9	8.4	9	623.5	710.1	791.2	889.2
8	A330-300 WV020	7.2	7.9	8.4	9	610.6	702.4	787.8	889.3
9	A380-800 WV000	7.2	7.9	8.4	9	641.3	815.3	976.2	1159.2
11	B727-200 Advanced Basic	7.2	7.9	8.4	9	510.1	541.8	563	584.8
12	B737-200 Advanced QC	7.2	7.9	8.4	9	344.6	363.5	375.7	389.3
13	B717-200 HGW	7.2	7.9	8.4	9	347.5	366.7	378.3	391.3

No.	Aircraft Name	(A)	(B)	(C)	(D)	ACR/A	ACR/B	ACR/C	ACR/D
14	B737-300	7.2	7.9	8.4	9	386.5	403.8	416.7	429.3
15	B737-400	7.2	7.9	8.4	9	429.7	450.3	464.2	478.8
16	B737-500	7.2	7.9	8.4	9	370	388	400.2	413.4
17	B737-700	7.2	7.9	8.4	9	420.8	441.8	455.6	470.4
18	B737-800	7.2	7.9	8.4	9	502.6	524.8	539.3	555.7
19	B737-900	7.2	7.9	8.4	9	509.1	530.9	546.2	562.7
20	B747-400ER	7.2	7.9	8.4	9	646.5	751.1	833.7	920.8
22	B757-200	7.2	7.9	8.4	9	313.4	373.2	421.1	472.7
23	B757-300	7.2	7.9	8.4	9	362	428.3	479.3	533.9
24	B767-200 ER	7.2	7.9	8.4	9	476.2	563.9	636.2	714.9
25	B767-300 ER/Freighter	7.2	7.9	8.4	9	529.4	623.1	698.9	781.1
26	B767-400 ER	7.2	7.9	8.4	9	636.8	745.4	829.3	917.2
27	B777-200 ER	7.2	7.9	8.4	9	575	741.9	885.4	1042.6
28	B787-8	7.2	7.9	8.4	9	640.8	745.8	831.2	922.7
29	C-130	7.2	7.9	8.4	9	274.3	305.3	329.3	354.6
30	DC/MD-10-10/10F	7.2	7.9	8.4	9	539.6	631.5	712.9	805.6
31	D-100	7.2	7.9	8.4	9	276.8	294	305.8	317.2
32	D-20	7.2	7.9	8.4	9	32.7	39.3	43.9	48.6
33	D-30	7.2	7.9	8.4	9	59.8	68.1	73.9	79.6
34	D-50	7.2	7.9	8.4	9	83.6	96.7	105.7	114.5
35	D-75	7.2	7.9	8.4	9	185.3	201.8	212.8	223.4
36	MD-11	7.2	7.9	8.4	9	668.1	784.2	879.1	984.9
38	MD-83	7.2	7.9	8.4	9	494.3	513.8	526.8	540.5
39	MD-90-30 ER	7.2	7.9	8.4	9	515.5	535.7	549.5	563.5
40	CRJ100/200	7.2	7.9	8.4	9	126.9	134.5	139.8	145.2
41	CRJ700	7.2	7.9	8.4	9	180.9	194.6	204.1	213.7

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2
Section: Airport E RUNWAY 10C-28C
This file name = PCR Results for New Rigid 2022-05-31 14:30:30 Evaluation

pavement type is rigid and design program is FAARFIELD.

Section name: Airport E RUNWAY 10C-28C in job file: PCR Comparisons 2.JOB.xml

Units = US Customary

Analysis Type: New Rigid
Subgrade Modulus =12,542 psi (Subgrade Category is C)

Evaluation Pavement Thickness = 30.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.570

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	A330-200 WV020	469,000	94.80	210	81	785
2	A340-300 std	600,000	79.40	203	840	8,862
3	A340-300 std Belly	600,000	15.20	156	840	5,462
4	A380-800 WV000	894,000	38.00	157	424	1,884
5	A380-800 WV000 Belly	894,000	57.00	157	424	1,697
6	B747-400	873,000	46.60	199	2,722	15,527
7	B747-400 Belly	873,000	46.60	199	2,722	15,551
8	B767-300 ER/Freighter	409,000	92.40	198	3,454	18,778
9	B777-300	722,000	94.80	234	3,372	17,023
10	A300-600 Std Bogie	375,000	95.00	192	1,019	5,994
11	DC/MD-10-10/10F	458,000	93.40	195	71	370
12	MD-11	621,000	77.60	202	606	3,262
13	MD-11 Belly	621,000	17.00	177	606	3,989
14	B757-200	250,000	91.20	179	291	1,439
15	A320-200 std	150,000	93.80	184	24,656	127,254
16	B737-800	173,000	93.60	202	26,655	149,152
17	B727-200 Advanced Basic	172,000	96.00	137	1,346	8,914
18	D-50	45,000	95.00	72	28,229	143,547
19	S-30	22,500	95.00	56	3,808	10,436

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/R/C
1	B777-300	3,401	739,602	20.1	1137.8

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

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/R/C
1	A330-200 WV020	469,000	94.80	210	15.8	704.7
2	A340-300 std	600,000	94.60001	203	16.4	762
3	A380-800 WV000	894,000	95	157	14.1	565.8
4	B747-400	873,000	93.2	199	16.4	762.6
5	B767-300 ER/Freighter	409,000	92.40	198	15.6	688.2
6	B777-300	722,000	94.80	234	19.7	1094
7	A300-600 Std Bogie	375,000	95.00	192	15.6	691.7
8	DC/MD-10-10/10F	458,000	93.40	195	15.9	712.9
9	MD-11	621,000	94.60001	202	17.4	855.3
10	B757-200	250,000	91.20	179	12.0	406.8
11	A320-200 std	150,000	93.80	184	12.5	440.7
12	B737-800	173,000	93.60	202	13.7	532.5
13	B727-200 Advanced Basic	172,000	96.00	137	13.5	515.7
14	D-50	45,000	95.00	72	6.0	105.7
15	S-30	22,500	95.00	56	4.6	65.1

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2
Section: Airport F RUNWAY 9-27
This file name = PCR Results for HMA on Rigid 2022-05-23 14:35:23

Evaluation pavement type is rigid and design program is FAARFIELD. Section

name: Airport F RUNWAY 9-27 in job file: PCR Comparisons 2.JOB.xml Units

= US Customary

Analysis Type: HMA on Rigid
Subgrade Modulus =7,500 psi (Subgrade Category is D)

Evaluation Pavement Thickness = 30.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 4

CDF = 0.000

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	A300-600 Std Bogie	380,518	95.00	194	18	292
2	A318-100 opt	141,978	89.20	169	553	8,868
3	A320-200 std	150,796	93.80	185	170	2,727
4	A321-100 std	183,866	95.60	197	28	454
5	B717-200 HGW	122,000	94.40	164	111	1,622
6	B727-200 Advanced Basic	185,200	96.00	148	5	81
7	B737-300	140,000	90.80	201	651	9,883
8	B737-700	155,000	91.80	197	2,000	31,462
9	B737-800	174,700	93.60	204	235	3,715
10	B737-900 ER	188,200	94.60	220	53	838
11	B757-200	256,000	91.20	183	137	2,137
12	B767-400 ER	451,000	94.00	215	4	67
13	B787-9	555,000	93.60	223	4	58
14	CRJ100/200	47,450	93.00	159	102	1,280
15	CRJ700	72,500	95.00	141	473	6,712
16	DC/MD-10-10/10F	458,000	93.40	195	10	155
17	DC9-32	109,000	92.40	155	9	130
18	Q400/Dash 8 Series 400	64,700	93.00	227	122	1,579
19	ERJ-145 ER	45,635	95.00	145	143	1,833
20	ERJ-145 XR	53,352	95.00	175	187	2,393
21	EMB-170 STD	79,697	95.00	126	864	12,804
22	EMB-190 STD	105,712	95.00	147	11	172
23	MD-11	633,000	77.60	206	17	267
24	MD-11 Belly	633,000	17.00	180	17	281
25	MD-83	161,000	94.80	195	209	3,151
26	MD-90-30 ER	168,500	94.00	193	235	3,552

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/F/D
1	MD-11	17	1,496,246	70.8	3644.6

Results Table 3. Hot-Mix Asphalt on Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (D)	ACR/F/D
1	A300-600 Std Bogie	380,518	95.00	194	37.2	808.2
2	A318-100 opt	141,978	89.20	169	26.5	349.7
3	A320-200 std	150,796	93.80	185	28.2	403.7
4	A321-100 std	183,866	95.60	197	31.6	536.3
5	B717-200 HGW	122,000	94.40	164	27.5	382.3
6	B727-200 Advanced Basic	185,200	96.00	148	32.2	564.6
7	B737-300	140,000	90.80	201	27.8	390.6
8	B737-700	155,000	91.80	197	28.7	422.9
9	B737-800	174,700	93.60	204	30.9	509.5
10	B737-900 ER	188,200	94.60	220	32.4	574.7
11	B757-200	256,000	91.20	183	29.5	450.6
12	B767-400 ER	451,000	94.00	215	38.8	891
13	B787-9	555,000	93.60	223	40.3	977.3
14	CRJ100/200	47,450	93	159	18.6	141.7
15	CRJ700	72,500	95	141	21.0	196.9
16	DC/MD-10-10/10F	458,000	93.40	195	35.6	723.7
17	DC9-32	109,000	92.40	155	25.7	327.5
18	Q400/Dash 8 Series 400	64,700	93	227	21.1	199.4
19	ERJ-145 ER	45,635	95.00	145	18.1	132.3

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (D)	ACR/F/D
20	ERJ-145 XR	53,352	95.00	175	19.7	166.4
21	EMB-170 STD	79,697	95.00	126	21.3	203.5
22	EMB-190 STD	105,712	95.00	147	23.5	266.6
23	MD-11	633,000	94.60001	206	39.2	911.7
24	MD-83	161,000	94.80	195	31.5	533.3
25	MD-90-30 ER	168,500	94.00	193	32.1	560.7

AIRPORT F
RUNWAY 9-27
(RIGID PCR – FLEXIBLE COMPUTATION OPTION DISABLED)

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2
Section: Airport F RUNWAY 9-27
This file name = PCR Results for HMA on Rigid 2022-05-23 15:36:56

Evaluation pavement type is rigid and design program is FAARFIELD. Section

name: Airport F RUNWAY 9-27 in job file: PCR Comparisons 2.JOB.xml Units

= US Customary

Analysis Type: HMA on Rigid
Subgrade Modulus =7,500 psi (Subgrade Category is D)

Evaluation Pavement Thickness = 30.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 4

CDF = 18.510

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	A300-600 Std Bogie	380,518	95.00	194	18	107
2	A318-100 opt	141,978	89.20	169	553	2,854
3	A320-200 std	150,796	93.80	185	170	880
4	A321-100 std	183,866	95.60	197	28	163
5	B717-200 HGW	122,000	94.40	164	111	621
6	B727-200 Advanced Basic	185,200	96.00	148	5	34
7	B737-300	140,000	90.80	201	651	3,352
8	B737-700	155,000	91.80	197	2,000	10,677
9	B737-800	174,700	93.60	204	235	1,321
10	B737-900 ER	188,200	94.60	220	53	299
11	B757-200	256,000	91.20	183	137	685
12	B767-400 ER	451,000	94.00	215	4	22
13	B787-9	555,000	93.60	223	4	19
14	CRJ100/200	47,450	93.00	159	102	376
15	CRJ700	72,500	95.00	141	473	2,238
16	DC/MD-10-10/10F	458,000	93.40	195	10	52
17	DC9-32	109,000	92.40	155	9	49
18	Q400/Dash 8 Series 400	64,700	93.00	227	122	438
19	ERJ-145 ER	45,635	95.00	145	143	552
20	ERJ-145 XR	53,352	95.00	175	187	710
21	EMB-170 STD	79,697	95.00	126	864	4,425
22	EMB-190 STD	105,712	95.00	147	11	57
23	MD-11	633,000	77.60	206	17	92
24	MD-11 Belly	633,000	17.00	180	17	113
25	MD-83	161,000	94.80	195	209	1,222
26	MD-90-30 ER	168,500	94.00	193	235	1,407

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/R/D
1	MD-11	31	531,017	17.2	769.7

Results Table 3. Hot-Mix Asphalt on Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (D)	ACR/R/D
1	A300-600 Std Bogie	380,518	95.00	194	37.2	808.2
2	A318-100 opt	141,978	89.20	169	26.5	349.7
3	A320-200 std	150,796	93.80	185	28.2	403.7
4	A321-100 std	183,866	95.60	197	31.6	536.3
5	B717-200 HGW	122,000	94.40	164	27.5	382.3
6	B727-200 Advanced Basic	185,200	96.00	148	32.2	564.6
7	B737-300	140,000	90.80	201	27.8	390.6
8	B737-700	155,000	91.80	197	28.7	422.9
9	B737-800	174,700	93.60	204	30.9	509.5
10	B737-900 ER	188,200	94.60	220	32.4	574.7
11	B757-200	256,000	91.20	183	29.5	450.6
12	B767-400 ER	451,000	94.00	215	38.8	891
13	B787-9	555,000	93.60	223	40.3	977.3
14	CRJ100/200	47,450	93	159	18.6	141.7
15	CRJ700	72,500	95	141	21.0	196.9
16	DC/MD-10-10/10F	458,000	93.40	195	35.6	723.7
17	DC9-32	109,000	92.40	155	25.7	327.5
18	Q400/Dash 8 Series 400	64,700	93	227	21.1	199.4

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (D)	ACR/R/D
19	ERJ-145 ER	45,635	95.00	145	18.1	132.3
20	ERJ-145 XR	53,352	95.00	175	19.7	166.4
21	EMB-170 STD	79,697	95.00	126	21.3	203.5
22	EMB-190 STD	105,712	95.00	147	23.5	266.6
23	MD-11	633,000	94.60001	206	39.2	911.7
24	MD-83	161,000	94.80	195	31.5	533.3
25	MD-90-30 ER	168,500	94.00	193	32.1	560.7

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.17a (Build 04/28/2022)

Job Name: PCR Comparisons 2
Section: Airport G RUNWAY 16L-34R
This file name = PCR Results for New Rigid 2022-04-29 12:17:03 Evaluation

pavement type is rigid and design program is FAARFIELD.

Section name: Airport G RUNWAY 16L-34R in job file: PCR Comparisons 2.JOB.xml

Units = US Customary

Analysis Type: New Rigid
Subgrade Modulus =13,626 psi (Subgrade Category is C)

Evaluation Pavement Thickness = 25.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.000

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	DC9-32	109,000	92.40	155	8	44
2	B717-200 HGW	122,000	94.40	164	301	1,683
3	A318-100 std	124,500	90.40	148	654	3,509
4	A319-100 std	142,500	92.60	174	13,002	69,845
5	A320-200 std	151,000	93.80	185	15,280	79,123
6	MD-83	161,000	94.80	195	739	4,321
7	MD-90-30 ER	168,500	94.00	193	213	1,275
8	B727-200 Advanced Basic	185,200	96.00	148	111	762
9	B737-700	188,200	91.80	239	18,133	106,563
10	B757-300	271,000	92.60	195	10,179	51,161
11	DC8-63/73	358,000	96.20	196	79	469
12	A300-B4/C4 Std Bogie	365,750	94.00	216	831	4,557
13	B767-300 ER/Freighter	413,000	92.40	200	2,521	13,772
14	DC/MD-10-10/10F	458,000	93.40	195	115	599
15	B787-8	478,000	91.40	216	32	162
16	A330-200 WV020	509,000	94.80	228	88	889
17	A340-300 std	608,000	79.40	206	179	1,901
18	A340-300 std Belly	608,000	15.20	158	179	1,172
19	MD-11	633,000	77.60	206	44	239
20	MD-11 Belly	633,000	17.00	180	44	292
21	B747-400	877,000	46.60	200	754	4,311
22	B747-400 Belly	877,000	46.60	200	754	4,317
23	A380-800 WV000	1,235,000	38.00	217	59	308
24	A380-800 WV000 Belly	1,235,000	57.00	217	59	277
25	B777-200	537,000	95.40	179	1,095	5,199

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max. Allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/R/C
1	A380-800 WV000	105	1,713,729	24.3	1660.5

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

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/R/C
1	DC9-32	109,000	92.40	155	10.7	324.5
2	B717-200 HGW	122,000	94.40	164	11.5	378.3
3	A318-100 std	124,500	90.40	148	10.6	318.9
4	A319-100 std	142,500	92.60	174	11.8	397.6
5	A320-200 std	151,000	93.80	185	12.5	444.1
6	MD-83	161,000	94.80	195	13.6	526.8
7	MD-90-30 ER	168,500	94.00	193	13.9	549.5
8	B727-200 Advanced Basic	185,200	96.00	148	14.1	563
9	B737-700	188,200	91.80	239	14.2	571.7
10	B757-300	271,000	92.60	195	12.9	473.1
11	DC8-63/73	358,000	96.20	196	15.7	692.9
12	A300-B4/C4 Std Bogie	365,750	94.00	216	15.4	667.3
13	B767-300 ER/Freighter	413,000	92.40	200	15.7	698.9
14	DC/MD-10-10/10F	458,000	93.40	195	15.9	712.9
15	B787-8	478,000	91.40	216	17.0	811.1
16	A330-200 WV020	509,000	94.80	228	16.7	791.1
17	A340-300 std	608,000	94.60001	206	16.6	776.5

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/R/C
18	MD-11	633,000	94.60001	206	17.7	879.1
19	B747-400	877,000	93.2	200	16.5	767.6
20	A380-800 WV000	1,235,000	95	217	18.6	971
21	B777-200	537,000	95.40	179	15.3	659.3

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2
Section: Airport G RUNWAY 16L-34R
This file name = PCR Results for New Rigid 2022-05-31 15:48:04 Evaluation

pavement type is rigid and design program is FAARFIELD.

Section name: Airport G RUNWAY 16L-34R in job file: PCR Comparisons 2.JOB.xml

Units = US Customary

Analysis Type: New Rigid
Subgrade Modulus =13,626 psi (Subgrade Category is C)

Evaluation Pavement Thickness = 22.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.180

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	DC9-32	109,000	92.40	155	8	44
2	B717-200 HGW	122,000	94.40	164	301	1,683
3	A318-100 std	124,500	90.40	148	654	3,509
4	A319-100 std	142,500	92.60	174	13,002	69,845
5	A320-200 std	151,000	93.80	185	15,280	79,123
6	MD-83	161,000	94.80	195	739	4,321
7	MD-90-30 ER	168,500	94.00	193	213	1,275
8	B727-200 Advanced Basic	185,200	96.00	148	111	762
9	B737-700	188,200	91.80	239	18,133	106,563
10	B757-300	271,000	92.60	195	10,179	51,161
11	DC8-63/73	358,000	96.20	196	79	469
12	A300-B4/C4 Std Bogie	365,750	94.00	216	831	4,557
13	B767-300 ER/Freighter	413,000	92.40	200	2,521	13,772
14	DC/MD-10-10/10F	458,000	93.40	195	115	599
15	B787-8	478,000	91.40	216	32	162
16	A330-200 WV020	509,000	94.80	228	88	889
17	A340-300 std	608,000	79.40	206	179	1,901
18	A340-300 std Belly	608,000	15.20	158	179	1,172
19	MD-11	633,000	77.60	206	44	239
20	MD-11 Belly	633,000	17.00	180	44	292
21	B747-400	877,000	46.60	200	754	4,311
22	B747-400 Belly	877,000	46.60	200	754	4,317
23	A380-800 WV000	1,235,000	38.00	217	59	308
24	A380-800 WV000 Belly	1,235,000	57.00	217	59	277
25	B777-200	537,000	95.40	179	1,095	5,199

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at Max. MGW (in.)	PCR/R/C
1	A380-800 WV000	519	1,336,776	19.8	1107.8

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

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/R/C
1	DC9-32	109,000	92.40	155	10.7	324.5
2	B717-200 HGW	122,000	94.40	164	11.5	378.3
3	A318-100 std	124,500	90.40	148	10.6	318.9
4	A319-100 std	142,500	92.60	174	11.8	397.6
5	A320-200 std	151,000	93.80	185	12.5	444.1
6	MD-83	161,000	94.80	195	13.6	526.8
7	MD-90-30 ER	168,500	94.00	193	13.9	549.5
8	B727-200 Advanced Basic	185,200	96.00	148	14.1	563
9	B737-700	188,200	91.80	239	14.2	571.7
10	B757-300	271,000	92.60	195	12.9	473.1
11	DC8-63/73	358,000	96.20	196	15.7	692.9
12	A300-B4/C4 Std Bogie	365,750	94.00	216	15.4	667.3
13	B767-300 ER/Freighter	413,000	92.40	200	15.7	698.9
14	DC/MD-10-10/10F	458,000	93.40	195	15.9	712.9
15	B787-8	478,000	91.40	216	17.0	811.1
16	A330-200 WV020	509,000	94.80	228	16.7	791.1
17	A340-300 std	608,000	94.60001	206	16.6	776.5

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (C)	ACR/R/C
18	MD-11	633,000	94.60001	206	17.7	879.1
19	B747-400	877,000	93.2	200	16.5	767.6
20	A380-800 WV000	1,235,000	95	217	18.6	971
21	B777-200	537,000	95.40	179	15.3	659.3

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.17a (Build 04/28/2022)

Job Name: PCR Comparisons 2
Section: Airport H RUNWAY 5R-23L
This file name = PCR Results for New Rigid 2022-04-29 14:46:41 Evaluation

pavement type is rigid and design program is FAARFIELD.

Section name: Airport H RUNWAY 5R-23L in job file: PCR Comparisons 2.JOB.xml

Units = US Customary

Analysis Type: New Rigid
Subgrade Modulus =18,614 psi (Subgrade Category is B)

Evaluation Pavement Thickness = 24.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 4

CDF = 0.000

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	B747-400	870,000	46.60	198	67	382
2	B747-400 Belly	870,000	46.60	198	67	382
3	L-1011	483,500	94.80	175	1,809	10,423
4	B757-200	230,000	91.20	164	5,335	25,312
5	B767-200	357,000	92.40	184	1,509	7,862
6	DC8-63/73	355,000	96.20	194	2,925	17,310
7	B727-200 Advanced Basic	190,500	96.00	152	7,135	49,690
8	B727-100C Alternate	160,000	95.40	155	3,364	20,299
9	DC9-32	90,700	92.40	129	318	1,580
10	DC9-51	121,000	94.00	171	3,528	19,133
11	MD-83	140,000	94.80	170	2,461	13,428
12	B737-300	150,000	90.80	215	5,414	28,844
13	B737-100	115,000	92.00	163	887	4,709
14	BAC 1-11 400 (UDA)	79,000	92.00	122	176	775
15	BAe 146-300/300QC/300QT	93,000	94.20	137	550	2,912
16	Q100/Dash 8 Series 100	41,100	94.40	155	2,030	7,812
17	C-130-57	155,000	95.00	105	441	1,887
18	F4 (UDA)	58,000	95.00	261	147	388

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total Equiv. Departures	Max. Allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at max. MGW (in.)	PCR/R/B
1	B747-400	2,335	1,160,122	18.5	1037.1

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

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (B)	ACR/R/B
1	B747-400	870,000	93.2	198	14.9	677.7
2	L-1011	483,500	94.80	175	14.8	667.2
3	B757-200	230,000	91.20	164	10.2	317.9
4	B767-200	357,000	92.40	184	12.7	495.3
5	DC8-63/73	355,000	96.20	194	14.2	616.5
6	B727-200 Advanced Basic	190,500	96.00	152	13.5	560.5
7	B727-100C Alternate	160,000	95.40	155	12.3	462.2
8	DC9-32	90,700	92.40	129	9.0	250.5
9	DC9-51	121,000	94.00	171	10.9	364
10	MD-83	140,000	94.80	170	11.9	435.3
11	B737-300	150,000	90.80	215	12.0	438.8
12	B737-100	115,000	92.00	163	10.0	306.8
13	BAC 1-11 400 (UDA)	79,000	92	122	7.9	195.3
14	BAe 146-300/300QC/300QT	93,000	94.20	137	9.1	253.7
15	Q100/Dash 8 Series 100	41,100	94.4	155	5.9	111.4
16	C-130-57	155,000	95.00	105	10.1	311.3
17	F4 (UDA)	58,000	95	261	5.6	100.5

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2
Section: Airport I RUNWAY 17L-35R
This file name = PCR Results for New Rigid 2022-05-19 14:52:29 Evaluation

pavement type is rigid and design program is FAARFIELD.

Section name: Airport I RUNWAY 17L-35R in job file: PCR Comparisons 2.JOB.xml

Units = US Customary

Analysis Type: New Rigid
Subgrade Modulus =49,942 psi (Subgrade Category is A)

Evaluation Pavement Thickness = 27.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 32458680.000

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	B737-200 Advanced QC	128,600	92.00	182	1,937	10,102
2	B737-800	174,700	93.60	204	52	292
3	B777-300	657,000	94.80	213	130	626
4	A319-100 std	142,000	92.60	173	52	279
5	A320-200 std	162,900	93.80	200	1,339	7,199
6	A320-200 std	150,800	93.80	185	3,744	19,375
7	A330-200 WV020	509,000	94.80	228	1,378	13,915
8	A330-300 WV022	515,700	95.80	206	104	1,117
9	B747-8	978,000	47.40	218	365	2,042
10	B747-8 Belly	978,000	47.40	218	365	2,048
11	B787-8	503,500	91.40	228	730	3,800

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical Aircraft Total equiv. Departures	Max allowable Gross Weight of Critical Aircraft (lb)	ACR Thick at max. MGW (in.)	PCR/R/A
1	A330-200 WV020	1,996	226,751	8.4	245.5

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

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (A)	ACR/R/A
1	B737-200 Advanced QC	128,600	92.00	182	10.0	344.6
2	B737-800	174,700	93.60	204	12.1	502.6
3	B777-300	657,000	94.80	213	13.5	615.9
4	A319-100 std	142,000	92.60	173	10.2	359
5	A320-200 std	162,900	93.80	200	11.5	448.6
6	A320-200 std	150,800	93.80	185	10.9	408.3
7	A330-200 WV020	509,000	94.80	228	13.5	623.5
8	A330-300 WV022	515,700	95.80	206	13.5	620.9
9	B747-8	978,000	94.8	218	14.4	709.1
10	B787-8	503,500	91.40	228	14.1	674.7

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.18a (Build 05/17/2022)

Job Name: PCR Comparisons 2
Section: Airport I Runway 17L-35R
This file name = PCR Results for New Rigid 2022-05-19 15:09:25 Evaluation

pavement type is rigid and design program is FAARFIELD.

Section name: Airport I Runway 17L-35R in job file: PCR Comparisons 2.JOB.xml

Units = US Customary

Analysis Type: New Rigid
Subgrade Modulus =49,942 psi (Subgrade Category is A)

Evaluation Pavement Thickness = 34.6 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.520

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight	Tire Pressure (psi)	Annual Departure	20 Years Coverage
1	B737-200 Advanced QC	128,600	92.00	182	1,937	10,102
2	B737-800	174,700	93.60	204	52	292
3	B777-300	657,000	94.80	213	130	626
4	A319-100 std	142,000	92.60	173	52	279
5	A320-200 std	162,900	93.80	200	1,339	7,199
6	A320-200 std	150,800	93.80	185	3,744	19,375
7	A330-200 WV020	509,000	94.80	228	1,378	13,915
8	A330-300 WV022	515,700	95.80	206	104	1,117
9	B747-8	978,000	47.40	218	365	2,042
10	B747-8 Belly	978,000	47.40	218	365	2,048
11	B787-8	503,500	91.40	228	730	3,800

Results Table 2. Pavement Classification Rating Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft (lb)	ACR Thick at max. MGW (in.)	PCR/R/A
1	B747-8	658	1,002,251	14.7	735.6

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

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (A)	ACR/R/A
1	B737-200 Advanced QC	128,600	92.00	182	10.0	344.6
2	B737-800	174,700	93.60	204	12.1	502.6

No.	Aircraft Name	Gross Weight (lb)	Percent Gross Weight on Main Gear	Tire Pressure (psi)	ACR Thick (in.) (A)	ACR/R/A
3	B777-300	657,000	94.80	213	13.5	615.9
4	A319-100 std	142,000	92.60	173	10.2	359
5	A320-200 std	162,900	93.80	200	11.5	448.6
6	A320-200 std	150,800	93.80	185	10.9	408.3
7	A330-200 WV020	509,000	94.80	228	13.5	623.5
8	A330-300 WV022	515,700	95.80	206	13.5	620.9
9	B747-8	978,000	94.8	218	14.4	709.1
10	B787-8	503,500	91.40	228	14.1	674.7