ACR-PCR Implementation in Canada

What is ACR-PCR?

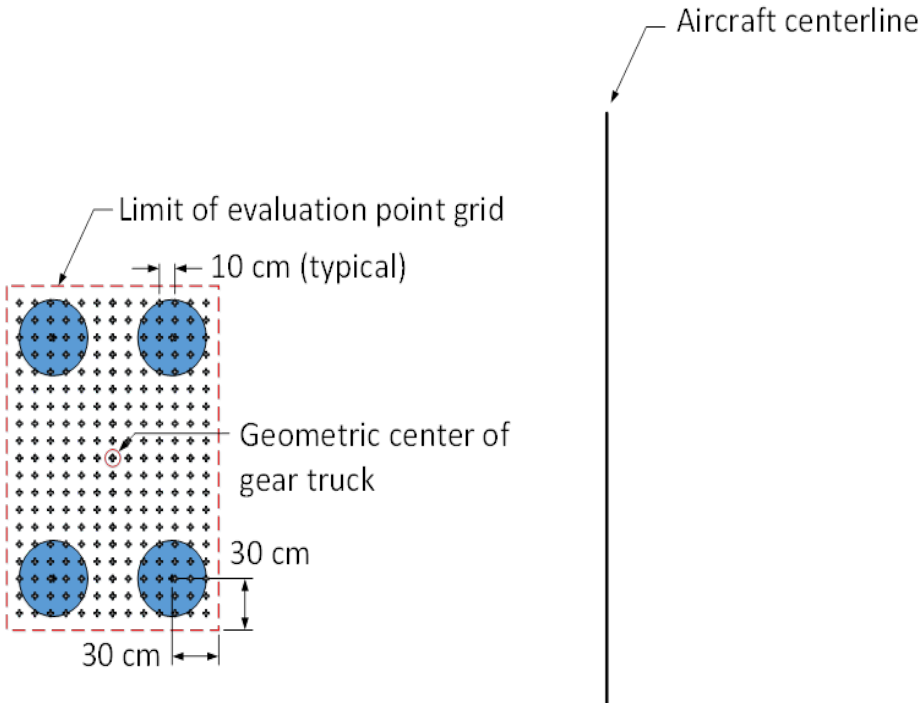
- Aircraft Classification Rating – Pavement Classification Rating
- ACR ≤ PCR
  - Provisions exist for overloading operations
- Will replace the ACN-PCN system
- Applicability 28 Nov 2024

Concept

- ACR-PCR method is for publication of pavement strength – NOT for pavement design
- Based on Cumulative Damage Factor (CDF) concept

- Continuous scale: 0 on lower end, no upper boundary
- Aircraft manufacturers publish ACRs calculated at two different masses:
  - Max apron mass
  - Empty operating mass
- ACRs provided for both flexible and rigid pavements, and at the four standard subgrade categories

- ICAO-ACR software will provide further ACR information, including values at any mass and centre of gravity



Reporting strength of pavements

- Pavements used by Aircraft ≤ 5700 kg
- Pavements used by Aircraft > 5700 kg

Reporting strength of pavements

- Pavements used by Aircraft ≤ 5700 kg
  - Maximum allowable aircraft mass
  - Maximum allowable tire pressure
- Pavements used by Aircraft > 5700 kg

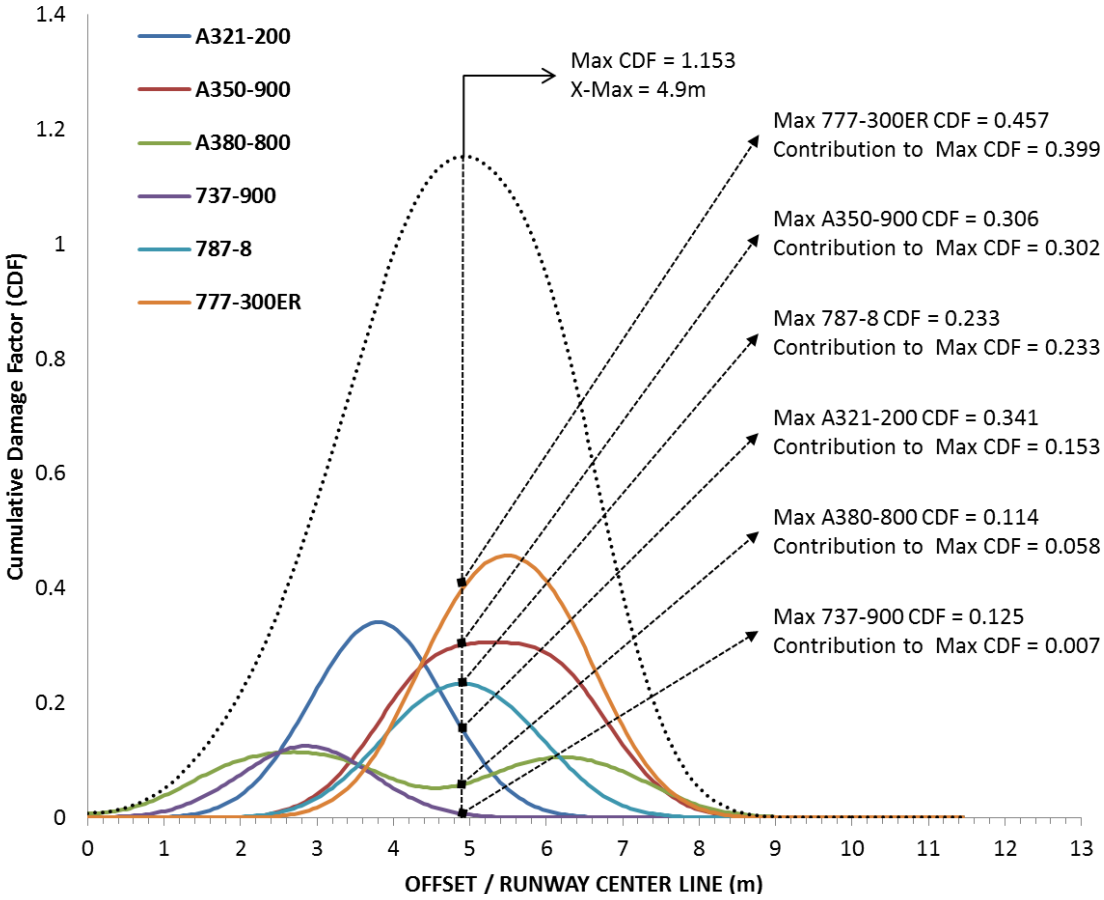
Reporting strength of pavements

- Pavements used by Aircraft ≤ 5700 kg
  - Maximum allowable aircraft mass
  - Maximum allowable tire pressure
- Pavements used by Aircraft > 5700 kg
  - Numerical Value
  - Pavement Type
  - Subgrade Strength Category
  - Tire Pressure Category
  - Evaluation Method

Mathematical Models

- ACR-PCR method uses the pavement damage model concept and linear elastic analysis (LEA)
- Computation of ACR can be performed using the ICAO-ACR software developed by the US FAA
- Computation of PCR will require use of modern pavement design software

Cumulative Damage Factor



Cumulative Damage Factor

- ACR-PCR method takes into account fleet mix, including lateral wander
- Standard deviation varies with travel speed

Pavement section	Standard Deviation s (meters)
High-speed sections (Runway, rapid exit taxiway)	0.75
Moderate-speed sections (Taxiways)	0.5
Aprons and low-speed sections	0

Lateral Wander

- Deviation occurs centred about the runway centreline
- Deviation follows a normal distribution function

Pavement Type:
- F: Flexible
- R: Rigid

Max Allowable Tire Pressure:
- W: No pressure limit
- X: 1.75MPa
- Y: 1.25MPa
- Z: 0.5MPa

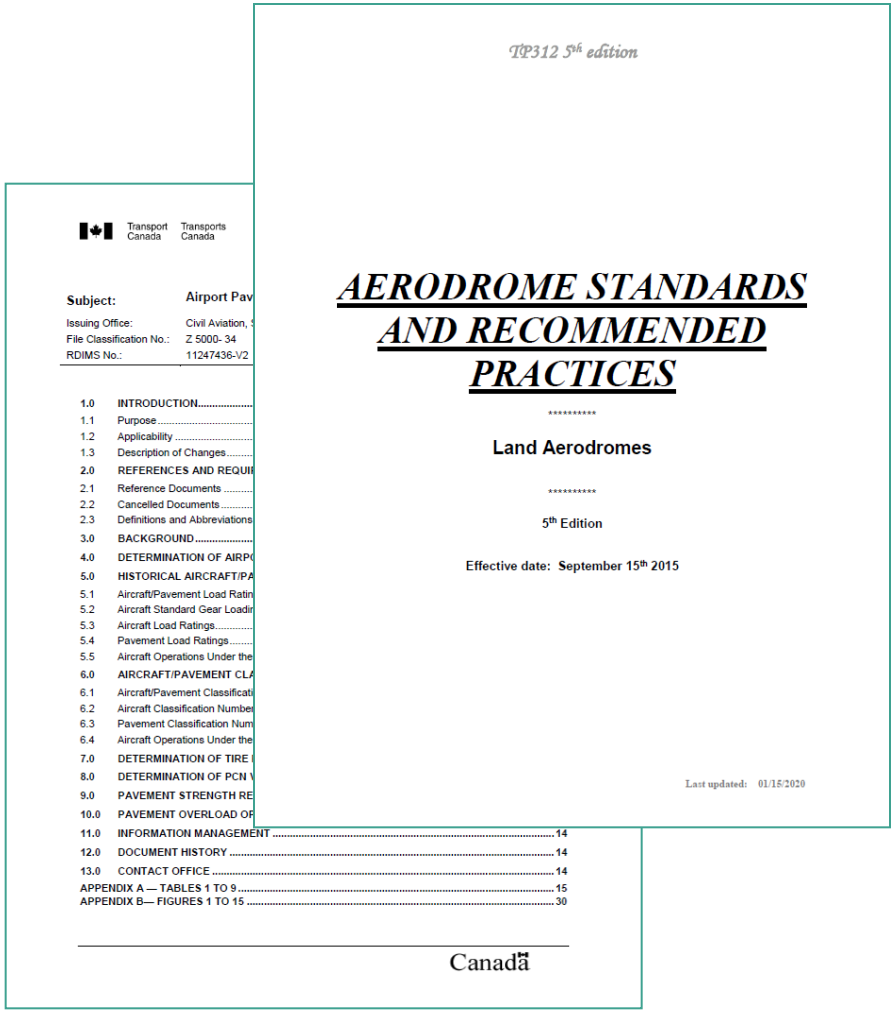
PCR 560 / F / B / W / T

Subgrade Strength Category:
- A: High
- B: Medium
- C: Low
- D: Ultra low

Evaluation Method:
- T: Technical Evaluation
- U: Using aircraft experience

Canadian Implementation

- Transport Canada intends to meet the ICAO applicability date of 28 November 2024
- Two documents require revision



TP312 5th Edition

TP312 5th edition

2.4.2 ACN-PCN Method of Reporting

2.4.2.1 The behaviour of a pavement is classified as equivalent to a rigid or flexible construction, for the purposes of determining the ACN.

2.4.2.2 Information on pavement type for PCN determination, subgrade strength category, maximum allowable tire pressure category and evaluation method is reported using the codes specified in Table 2.4.2.2.

TABLE 2.4.2.2—Pavement Classification Number (PCN) Reporting Codes

Pavement Type for ACN-PCN Determination	Codes
Rigid Pavement	R
Flexible Pavement	F
If the actual pavement construction is composite or non-standard, a note is included to that effect (see example 2 below).	
Subgrade Strength Category	
High Strength: characterized by k=150 MN/m³ and representing all k values above 120 MN/m³ for rigid pavements, and by CBR=15 and representing all CBR values above 13 for flexible pavements.	A
Medium Strength: characterized by k=80 MN/m³ and representing a range in k of 60 to 120 MN/m³ for rigid pavements, and by CBR=10 and representing a range in CBR of 8 to 13 for flexible pavements.	B
Low Strength: characterized by k=40 MN/m³ and representing a range in k of 25 to 60 MN/m³ for rigid pavements, and by CBR=6 and representing a range in CBR of 4 to 8 for flexible pavements.	C
Ultra Low Strength: characterized by k=20 MN/m³ and representing all k values below 25 MN/m³ for rigid pavements, and by CBR=3 and representing all CBR values below 4 for flexible pavements.	D
k = the bearing modulus determined at the slab/base course interface	
CBR = California bearing ratio	

AC 302-011

- Decommissioning of ALR-PLR method
- International designated airports report using ACR-PCR by 28 November 2024
- ACN-PCN to be phased out over a 3 year period for other aerodromes

Questions?