Airport Operations
Aerodrome Certification

The “Guiding Light” for Airport Operations

- Certified Aerodrome = one that is subject to inspection and required to operate in accordance with the AOM (Airport Operations Manual)

- AOM is approved by the Regional Superintendent Safety for Transport Canada on advice from the Aerodrome safety Inspector

- Operator must be able to monitor the current condition of the airport and make certain that basic, and regulated services are available to users.

Things Effecting Certification

- Lighting
- Surfaces
- Signage
- Transition markings/lineage
- Zoning
- Wildlife
- Environmental
- Traffic
- Security
NOTAMS- Notice to Airmen

Notices containing information concerning the establishment, condition, or change in any component of, or hazard in, the National Airspace System, the timely knowledge of which is essential to personnel concerned with flight operations.
Operational Priorities

- The AOM (Airport Operations Manual)
  - Apron Management Plan
  - Wildlife Management Plan
  - Snow and Ice Control Plan
  - Environmental Management Plan
  - Airfield Maintenance
  - Groundside Maintenance
  - Safety Program
  - Emergency Response Plan
  - Security Program
Airport Maintenance Plan - Primary Areas of Concern

- Operational Surfaces
- Visual Aides to Navigation
- Radios
- Terminal Building
- Mobile Equipment and Maintenance Facilities
- Access Roads and Paved Surfaces
- Signs and Fencing
- Obstruction Zoning
- Drainage
- Fire Fighting Equipment
Runway Maintenance
Pavement Management

Strong, level, dry and well-maintained pavement surfaces are required for the safe movement of aircraft around an airport’s airfield.

Inspection, maintenance, and repair of the runways, taxiways and apron areas are of the utmost importance to airport management

- Surface must be relatively even
- No holes
- No cracks and surface variations which could impair directional control of an aircraft
- Contaminates (mud, dirt, loose aggregate, foreign objects, rubber deposits) shall be removed promptly
- Surface must be properly drained to prevent ponding
Airport Runway Maintenance

Runway Surfaces
- Gravel
- Paved
- Concrete
- Turf

Problem Areas
- Water Ponding
- Snow buildup at edges (windrows)
- Uneven/cracked surfaces
- Eroding edges
- Open or silted joints
- Bumpy surfaces
Asphalt Problem Areas

Fig 1  Pattern Cracking

Fig 2  Transverse Cracking
Asphalt Problem Areas

Fig 6 Frost Heave

Possible Cracking

Fig 7 Surface Spalling

Dislodged Aggregate

Sand & Debris
Asphalt Problem Areas

Fig 3  Longitudinal Cracking

Fig 4  Rutting

LONGITUDINAL
Parallel to Traffic Flow

RUTTING

Heaving
Wheel Paths
Asphalt Problem Areas

Fig 8 Stepping/Faulting

Fig 10 Bird Baths
Defects in Gravel Surfaces

- washouts: uneven surfaces such as holes or ruts
- pot holes: holes in the gravel
- frost heaves: bumps in the road
- sub-grade failures: weak spot or depressions in the surface
- settling: water in a hole or low spots
- loss of the crown: the highest part of the surface is not in the centre but in the side
Turf Defects

- frost heaves  pronounced bumps with the rest of the turf remaining at its original elevation
- wet spots  wet areas of grass
- loss of turf  dead turf areas
- rutting  area under the wheel paths of aircraft and vehicles is depressed and the adjacent area is heaved upwards
- rocks  work their way to the surface because of frost.
Foreign Object Damage Control Program
The purpose of this formal program is to increase safety of airport operations and to reduce maintenance costs through the elimination of foreign object hazards. Visual inspections of the airport operating surfaces and reporting of any FOD by all airport operators are key to the entire program.

Foreign Objects
Any uncontrolled solid objects or materials on airside surfaces which are capable of damaging aircraft, vehicles, structures or injuring persons.

Foreign Object Damage (FOD)
Damage to equipment, or injuries to persons caused by foreign objects on aircraft movement areas.
FOD - Sources

1. Debris Created From Airside Surface Materials
2. Debris Originating From Airside Traffic
3. Debris Originating From Airline
4. Debris Originating From Aircraft Operations
5. Debris Originating From Climatic Influences
6. Debris Originating From Groundside
7. Debris Originating From Nearby Construction Sites
Airport Operations and Runway Surfaces

✈️ Pavement Classification Number — a number expressing the bearing strength of a pavement (the higher the number, the stronger the pavement – scale of 1 to 12)

✈️ Aircraft Classification Numbers (Load Ratings) - numbers expressing the relative effect of an aircraft loading on a pavement

✈️ Aircraft Operations — aircraft are permitted unrestricted operation on pavements if the load rating of the aircraft is equal or less than the load rating of the pavement
Snow and Ice Control Plan

This plan is established to advise all airport users of the priorities and contingencies in the event of snow and ice conditions. It establishes parameters whereby the airlines must comply. It includes:

• Prompt removal of control of snow, ice, etc.
• Selection and application of approved materials for snow and ice control
• Timely commencement of snow and ice operations
• Prompt notification to aircraft when any portion of the pavement is less than satisfactory.
Control Methods for Ice and Snow

- Mechanical – Snow Plows, Sweepers, Snow Blowers
- Chemical (ice), urea, potassium acetates, sodium formates, and glycol
Airfield snow removal equipment

Snow plows are specially designed and adjustable to the left or right, to roll the snow and throw it to either side. The articulated rubber blades are designed to clear runway lights. The plow illustrated above can clear 21 feet per pass at up to 40 mph.

A snow blower or thrower such as the one illustrated above can clear windrows at speeds of 35 mph and handle as much as 3,000 tons per hour.

A snow brush shown above can clear a heavy snowfall in one operation. Angled up to 45 degrees, the 14-foot-long brush scatters snow up to 50 yards to either side. Variable speed control can be set to slow speeds for sweeping surface dirt up to 550 rpm to clear heavy slush. By means of an air deflector snow is thrown high to be carried away by the wind, or low to avoid blowback.
Ice Control

Freezing Rain/Ice accumulation are potentially the most damaging weather phenomenon to affect airports. Methods to control ice on the pavement surfaces include the application of:

• Urea (granular fertilizer)
• Potassium acetates
• Sodium Formates
• Glycol

The idea with most of these chemicals is that they react with the ice to produce a chemical reaction that produces heat. The heat melts the ice and the snow removal equipment (plows, sweepers) are able to loosen and plow the ice off of the surface.
Aircraft De-Icing and Anti-icing Fluids

- Methyl alcohol – GA aircraft
- Glycols (mono-ethylene, di-ethylene, and propylene)
Runway Condition Reports

Runway Condition Reports — Reports undertaken by winter maintenance operations to inform flight operations of the condition of the runways and taxiways. Conditions include:

- Layers of ice or frost on runway
- Wet ice on runway
- Compacted snow on runway
- Slush on ice
- Loose snow on surface

Canadian Runway Friction Index — This is a mechanical/technical test normally carried out by the Airfield Foreman and quantifies runway conditions for pilots, especially on approach to a runway not having dry, bare pavement (scale runs from 0.6 (good) to 0.18 (poor))
One of the many factors used by Flight Crew to make their decision to land, or not, is an accurate CRFI report.

This report is used for recommended limits related to crosswinds and runway length.

Both of these limits must be considered when deciding to land.
Runway Length – The CRJ is more critical with regards to runway length than the Dash 8 due to higher approach speeds. Under normal aircraft operating conditions, the following table can be used as a guide to help determine preferred runway CRFI’s for available runway lengths:

<table>
<thead>
<tr>
<th>Airport Elevation</th>
<th>Dash 8 - Required Runway Length</th>
<th>CRFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level to 4000 feet</td>
<td>5000 feet or greater</td>
<td>.25 or greater</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Airport Elevation</th>
<th>CRJ - Available Runway Length</th>
<th>MIN CRFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Level</td>
<td>6000 feet</td>
<td>.40 or greater</td>
</tr>
<tr>
<td></td>
<td>6500 feet or greater</td>
<td>.30 or greater</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Airport Elevation</th>
<th>CRJ - Available Runway Length</th>
<th>MIN CRFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 to 2500</td>
<td>6000 feet</td>
<td>.45 or greater</td>
</tr>
<tr>
<td></td>
<td>6500 feet</td>
<td>.35 or greater</td>
</tr>
<tr>
<td></td>
<td>7000 feet or greater</td>
<td>.30 or greater</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Airport Elevation</th>
<th>CRJ - Available Runway Length</th>
<th>MIN CRFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 to 4500</td>
<td>6000 feet</td>
<td>.55 or greater</td>
</tr>
<tr>
<td></td>
<td>6500 feet</td>
<td>.40 or greater</td>
</tr>
<tr>
<td></td>
<td>7000 feet or greater</td>
<td>.30 or greater</td>
</tr>
</tbody>
</table>
Crosswind - The CRJ and the Dash 8 have the same maximum crosswind recommended CRFI limits. Under normal aircraft operating conditions, the following table can be used as a guide to help determine preferred runway CRFI’s for crosswind limits:

<table>
<thead>
<tr>
<th>Crosswind Component at 90°</th>
<th>CRFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 knots or less</td>
<td>.30 or greater</td>
</tr>
<tr>
<td>10 to 15 knots</td>
<td>.40 or greater</td>
</tr>
<tr>
<td>15 to 20 knots</td>
<td>.45 or greater</td>
</tr>
<tr>
<td>20 to 25 knots</td>
<td>.50 or greater</td>
</tr>
<tr>
<td>25 to 30 knots</td>
<td>.55 or greater</td>
</tr>
<tr>
<td>30 to 35 knots</td>
<td>.60 or greater</td>
</tr>
</tbody>
</table>
Operational Plans
Wildlife Management Plan
Wildlife – What’s the Problem?

- attract hawks
- strikes
- chewed cables
- mowing problems
- flooding
- undermining
The need for bird and mammal control arises from two types of damage caused by wildlife. The potential for damage to aircraft may result in loss of life through strikes with birds in the air and mammals on the ground. The potential damage wildlife can cause to airport grounds, equipment and structures. Damage to airport property is quite costly because of the cost of repairs and down-time during maintenance.
The basic aim of any bird and mammal control program is to reduce remove the problem species. The highest priorities are:

1. the active runway areas
2. the approach areas to active runways
3. the areas immediately adjacent to active runways
Wildlife Management – Key Considerations

- Planning Considerations
  - Identification of wildlife issues
  - Training of airport personnel
  - Wildlife Hazard Assessment
  - Wildlife Hazard Management Plan
  - Environmental Assessment

- Direct Management
  - Lethal control of hazardous wildlife
  - Non-lethal dispersal of hazardous wildlife
  - Habitat modification
  - Live-trap/Translocation of wildlife from airport
formalized wildlife surveys
identify hazardous wildlife species
general movements of the wildlife
attractants on and off airfield
recommendations to resolve issues
Wildlife Management Tools

Fencing:

Fig 01 Fence Components
Environmental Impact of Airports

Environmental factors must be considered for a new or expanded airport.

Major Topics:

1. Air and Water Quality
2. Ambient Noise Level
3. Ecological Processes
4. Natural Environment Values

An airport is a stimulus to a society in terms of economic growth and service it offers to the public. These benefits may be negated if compatibility between an airport and its environs is not achieved.