SESSION 10: WEATHER HAZARDS — FOG, FROST, LOW IFR, AND GO/NO-GO DECISIONS

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1. Radiation fog forms under which conditions?

A. Warm moist air moving over a cold surface with 5–15 knot winds

B. Cold dry air moving over a warm water surface

C. Clear, calm nights when the ground radiates heat and cools the air above it

D. Moist air forced up a terrain slope

2. Advection fog requires which element that radiation fog does not?

A. Nighttime radiational cooling

B. Rising terrain to force air upward

C. A warm water surface beneath cold air

D. Wind, typically 5 to 15 knots, to transport moist air over a cold surface

3. Radiation fog typically reaches its maximum thickness and extent:

A. Around sunrise, after which solar heating begins to burn it off

B. In the early afternoon at peak heating

C. During the late evening before midnight

D. Only during the passage of a cold front

4. Steam fog (sea smoke) forms when:

A. Warm moist air moves over a cold land surface at night

B. Rain falls through a dry layer and evaporates

C. Cold dry air moves over a relatively warm water surface

D. Moist air is lifted along a frontal boundary

5. Why is fog considered the operationally most dangerous low-visibility condition?

A. It always occurs with severe turbulence

B. It is confined to high altitudes only

C. It can form rapidly, persist beyond forecast, and produce zero-zero conditions

D. It is detectable only by airborne weather radar

6. Upslope fog is most commonly associated with:

A. Coastlines where maritime air meets cold ocean currents

B. Moist air forced up terrain slopes, such as the eastern Rockies

C. Calm valley floors at night

D. Warm water surfaces in autumn

7. The FAA's position regarding frost on aircraft surfaces before flight is that:

A. A thin layer of frost is acceptable if it is transparent

B. Frost must be removed only from the windscreen

C. Frost on the lower wing surfaces may remain

D. All frost must be removed from all surfaces before flight

8. Even a thin, barely visible layer of frost on the upper wing can:

A. Increase stall speed and reduce lift by disrupting the boundary layer

B. Improve lift by smoothing the airflow

C. Have no measurable aerodynamic effect

D. Affect only the aircraft's appearance, not performance

9. Precipitation-induced fog occurs when:

A. Rain or drizzle falls through a dry layer and evaporates, saturating the lower air

B. Cold air sinks into a valley overnight

C. Strong winds carry sea spray inland

D. Surface heating lifts moist air into cumulus clouds

10. Low-level wind shear (LLWS) near the surface is typically found below:

A. 5,000 feet AGL

B. 2,000 feet AGL

C. 10,000 feet MSL

D. The freezing level only

11. The most appropriate response to an unexpected fog encounter near the destination is to:

A. Attempt a lower-than-planned approach to find the runway

B. Circle the airport waiting for the fog to lift

C. Continue the approach and break out below minimums

D. Divert immediately to the alternate before fuel becomes a constraint

12. Frost forms on an aircraft surface when:

A. The surface temperature is above freezing with high humidity

B. The surface temperature is at or below 0°C and water vapor deposits directly as ice crystals

C. Supercooled rain freezes on contact during flight

D. The aircraft flies through a cloud layer below freezing

13. A downdraft/tailwind shear encounter on approach is more dangerous than a headwind shear because:

A. It increases airspeed and lift unexpectedly

B. The aircraft loses lift when it can least afford it

C. It has no aerodynamic effect at approach speeds

D. It only affects multi-engine aircraft

14. The first question in a sound go/no-go framework concerns:

A. Whether the alternate meets the 600-2 or 800-2 minimums

B. Whether the destination forecast is below 2,000/3

C. Whether current conditions are above minimums at the departure airport

D. Whether sufficient fuel exists for the alternate

15. Advection fog differs from radiation fog in that advection fog:

A. Forms only on clear, calm nights

B. Is always shallow, less than 100 feet deep

C. Dissipates immediately after sunrise

D. Can form and persist throughout the day, not just at night

16. "Get-there-itis" and external pressure are dangerous in go/no-go decisions because:

A. They have no physical relationship to the weather, which behaves the same regardless

B. They improve a pilot's risk assessment under stress

C. They are required considerations under the regulations

D. They reliably lead to better decisions when time is short

17. The continue/divert decision during a flight should be made:

A. At each decision point, applying the same framework as the initial go decision

B. Only at the final approach fix

C. Only after fuel becomes the limiting factor

D. Once at departure, then not revisited

18. Blowing dust and sand are particularly hazardous for IFR operations in arid regions because they:

A. Only reduce visibility at night

B. Form gradually over many hours

C. Are easily penetrated using standard approaches

D. Can reduce visibility to near zero almost instantaneously

19. A complete go/no-go evaluation considers which of the following in sequence?

A. Only the destination forecast at ETA

B. Departure conditions, destination forecast, route flyability, personal minimums, and a viable out

C. Only whether an alternate is legally required

D. Solely the total fuel on board

20. The appropriate response to a downdraft/tailwind microburst shear encountered on short final is to:

A. Reduce power and accept the descent

B. Maintain the current pitch and airspeed

C. Apply maximum power and execute a go-around/escape maneuver

D. Continue the approach and land quickly

21. A pilot planning a morning departure with radiation fog at the field should recognize that the fog:

A. Will definitely persist for the entire day

B. Has no effect on the planned departure

C. May burn off after sunrise but can also persist longer than forecast

D. Indicates an approaching cold front

22. A sound continue/divert decision recognizes that the time to decide to divert is:

A. When the data first suggests it, not after fuel becomes the secondary constraint

B. Only after passing the final approach fix

C. After two missed approaches at the destination

D. When the engine begins to run rough from fuel starvation

23. Haze (HZ) reduces visibility in a manner distinct from fog in that haze:

A. Always reduces visibility to below ¼ mile

B. Forms only over water surfaces

C. Is composed of supercooled water droplets

D. Reduces visibility diffusely, often worse looking toward the sun

24. External pressure in go/no-go decision-making is best neutralized by:

A. Weighting passenger expectations equally with the weather

B. Evaluating the weather data as if there were no schedule, passenger, or reputation at stake

C. Accepting slightly higher risk when a deadline is firm

D. Reducing personal minimums to accommodate the trip

25. The fundamental principle distinguishing regulatory minimums from personal minimums in a go decision is that:

A. Personal minimums are always lower than regulatory minimums

B. The two are identical and interchangeable

C. Regulatory minimums set the legal floor; personal minimums set the pilot's accepted risk ceiling

D. Regulatory minimums apply only to commercial operators

ANSWER KEY & EXPLANATIONS – SESSION 10

1. C. Clear/calm nights — Radiation fog forms on clear, calm nights when the ground radiates heat and cools the air above it.

2. D. Wind required — Advection fog requires wind (5–15 knots) to transport moist air over a cold surface, which radiation fog does not.

3. A. Around sunrise — Radiation fog reaches maximum thickness near sunrise, after which solar heating burns it off.

4. C. Cold air/warm water — Steam fog forms when cold dry air moves over a relatively warm water surface.

5. C. Rapid/persistent/zero-zero — Fog is most dangerous because it can form rapidly, persist beyond forecast, and produce zero-zero conditions.

6. B. Moist air up terrain — Upslope fog forms when moist air is forced up terrain slopes, such as the eastern Rockies.

7. D. Remove all frost — The FAA position is unambiguous: all frost must be removed from all surfaces before flight.

8. A. Increases stall speed — A thin layer of frost increases stall speed and reduces lift by disrupting the boundary layer.

9. A. Rain evaporates/saturates — Precipitation-induced fog forms when rain or drizzle evaporates through a dry layer, saturating the lower air.

10. B. Below 2,000 ft AGL — LLWS is typically found below 2,000 feet AGL near the surface.

11. D. Divert immediately — The appropriate response to unexpected destination fog is to divert immediately to the alternate before fuel becomes a constraint.

12. B. Vapor deposits as ice — Frost forms when the surface is at or below 0°C and water vapor deposits directly as ice crystals.

13. B. Lift loss when needed — A downdraft/tailwind shear causes the aircraft to lose lift when it can least afford it on approach.

14. C. Departure above minimums — The first go/no-go question is whether current conditions are above minimums at the departure airport.

15. D. Persists in daylight — Advection fog can form and persist throughout the day, unlike radiation fog tied to nighttime cooling.

16. A. No physical relationship — External pressures have no physical relationship to the weather, which behaves the same regardless.

17. A. Each decision point — The continue/divert decision is made at each decision point using the same framework as the initial go decision.

18. D. Near-zero instantly — Blowing dust and sand can reduce visibility to near zero almost instantaneously in arid regions.

19. B. Full sequence — A complete evaluation considers departure conditions, destination forecast, route flyability, personal minimums, and a viable out.

20. C. Max power/escape — The response to a downdraft/tailwind microburst shear on short final is maximum power and a go-around/escape maneuver.

21. C. May burn off or persist — Morning radiation fog may burn off after sunrise but can also persist longer than forecast.

22. A. When data first suggests — The time to decide to divert is when the data first suggests it, not after fuel becomes the secondary constraint.

23. D. Diffuse, worse toward sun — Haze reduces visibility diffusely and is typically worse looking toward the sun than away from it.

24. B. Evaluate as if no pressure — External pressure is neutralized by evaluating the weather as if there were no schedule, passenger, or reputation at stake.

25. C. Floor vs. risk ceiling — Regulatory minimums set the legal floor; personal minimums set the pilot's accepted risk ceiling.