

Winter Operations

Flying & Surviving In Winter Weather

Product Number: PP 07011002

WINTER OPERATIONS



Federal Aviation
Administration





OBJECTIVE:

- **Surviving Winter Weather**
- **Preflight Planning**
- **Winter Taxiing**
- **Enroute Considerations**
- **Servicing**

Surviving Winter Weather



Good and Bad News

Winter crashes

=

Better survivability

The Bad News



WINTER OPERATIONS



Requirements for Life

Air	3 minutes
Body Shelter	6 hours in severe weather
Water	3-6 days
Food	3 weeks
Will to live	??????

Basic Fears

- **Unknown**
- **Darkness**
- **Discomfort**
- **Being alone**

Basic Fears

- **Animals**
- **Personal guilt**
- **Punishment**
- **Loss**
- **DEATH**

Best Tool

1. You.
2. Injuries.
3. Temperatures.
4. Disease.

SURVIVAL Is:

● **80% Mental**

● **10% Equipment**

● **10% Skills**

On Hand Survival Equipment

- **The compass.**
- **Gasoline.**
- **Oil**
- **Seat upholstery**
- **Wiring**
- **The aircraft battery**

Stay with it – or start walking?

- **Did you file a flight plan?**
- **Is your ELT operating?**
- **Do you know where you are?**
- **Do you have a survival kit?**
- **Don't fight a storm.**

Stay put and find shelter.

- **Take the compass!**
- **Make a plan.**
- **Pack what you need.**



Use whatever is available to protect the body from the loss of heat

- **Make a fire**
- **Keep clothing dry.**
- **Eat sugary foods.**

WIND - CHILL CHART

		ACTUAL THERMOMETER READING F										
		50	40	30	20	10	0	-10	-20	-30	-40	-50
ESTIMATED WIND SPEED MPH	EQUIVALENT TEMPERATURE F											
	CALM	50	40	30	20	10	0	-10	-20	-30	-40	-50
5		48	37	27	16	6	-5	-15	-26	-36	-47	-57
10		40	28	16	4	-9	-21	-33	-46	-58	-70	-83
15		36	22	9	-5	-18	-36	-45	-58	-72	-85	-99
20		32	18	4	-10	-25	-39	-53	-67	-82	-96	-110
25		30	16	0	-15	-29	-44	-59	-74	-88	-104	-118
30		28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125
35		27	11	-4	-20	-35	-49	-67	-83	-98	-113	-129
40		26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132
		LITTLE DANGER FOR PROPERLY CLOTHED PERSON					INCREASING DANGER			GREAT DANGER		

Wind speeds greater
then 40 MPH have
little additional effect

DANGER FROM FREEZING
OF EXPOSED FLESH

Life Support Kit

- **Food and Energy Package
(1 person, 5-day rations)**
- **30 - wrapped sugar cubes**

Life Support Kit

- **10 - pita bread or 25
crackers**
- **10 - packets of salt**
- **3 - tea bags**

Life Support Kit

- **12 - rock candy**
- **5 - gum**
- **10 - bouillon cubes**
- **20 - protein wafers
(if available)**

Life Support Kit

- **Insect repellent**
- **Mosquito net**
- **Whistle**
- **50' of 1/8" nylon rope or shroud line**
- **Smoke flares or red day - night flares**

Life Support Kit

- **Waterproofed matches**
- **Candle or fire starter**
- **Signal mirror**
- **Small compass**
- **Knife - Boy Scout style**

Personal First Aid Kit

- **Sealable Plastic Container**
- **2 - Compress bandages**
- **1 - Triangle bandage**
- **Small roll 2" tape**
- **6 - 3 x 3 gauze pads**
- **25 - Aspirin**
- **10 - Band - Aids**

Personal First Aid Kit

- Razor blades or scissors
- Hotel size soap
- Kotex - purse size
- Kleenex - purse size, toilet paper
- 6 - safety pins
- 1 - Small tube of Unguentine

WINTER SURVIVAL KIT INFORMATION

1. Compass (aircraft compass is a backup)
2. Clothing (wool or synthetic gloves, hat, sweater, boots—cotton doesn't retain heat when wet) to survive most adverse conditions probable (garbage bags with holes cut for head and arms, pull up second bag for legs or poncho for wet weather)
3. Some form of emergency shelter (four seasons tent, ground cover, space or wool blanket, sleeping bag)
4. Extra food and water (Note: Water is more important.)
5. Flashlight with extra batteries and bulb
6. Fire starting material such as a candle or cotton balls covered in petroleum jelly, (35 mm plastic film containers make great storage containers for the cotton balls)
7. Waterproof matches or other means of starting a fire
8. Metal cup, can, or cooking pot for melting snow or cooking
9. First aid kit
10. Sunglasses or some type of eye protection
11. Knife, hatchet, or saw (Note: Big is not necessarily better.)
12. Tools (Leatherman®, pump pliers, basic tools)
13. Rope, parachute cord, dental floss (stronger than regular thread)
14. Map (A topographical one for your local area is best.)

HUMAN FACTORS

- **Clothing**

1. Multilayers of clothing worn loosely will provide more warmth than a bulky layer.
2. Loose clothing is more likely to snag or get caught on aircraft structures or components.

HUMAN FACTORS

- **Clothing**
Remove any snow or ice from clothing before entering cockpit.

HUMAN FACTORS

- **Clothing**
Dress to survive.

PRE-FLIGHT PLANNING

OPERATIONAL CONSIDERATIONS

Caution: Blowing Snow!

Pre-flight Weather Briefing

- Icing advisories
- NOTAMs for departure & destination
- Temperatures at flight level
- Air mass synopsis
- **FILE A FLIGHT PLAN!**

FLIGHT PLANS

FEDERAL AVIATION
FLIGHT PLAN

1. AIRCRAFT TYPE/SPEC: C182

2. AIRCRAFT IDENTIFICATION: N2757F

3. POINT OF DEPARTURE: SLC

4. DEPARTURE TIME: PROPOSED (Z) 1930, ACTUAL (Z)

5. INITIAL CRUISING ALTITUDE: 10500

6. PILOT'S NAME: John C. Smith

7. REMARKS: Wh./Red/Bk.

8. NO. OF PERSONS ABOARD: 1

9. FLIGHT PLAN UPON ARRIVAL: 1 (4-64) FORMERLY FAA 208

10. SPECIAL EQUIPMENT SUPPLY: A—DME & 4096 Code Transponder, S—DME & 4096 Code Transponder, D—DME

11. FLIGHT WATCH STATIONS: 1—DME & Transponder—no code, 2—4096 Code Transponder, 3—4096 Code Transponder, 4—4096 Code Transponder

12. AIRCRAFT: Wh./Red/Bk.

13. AIRSPEED: 130 KNOTS

14. ROUTE OF FLIGHT: DCA

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Route Considerations

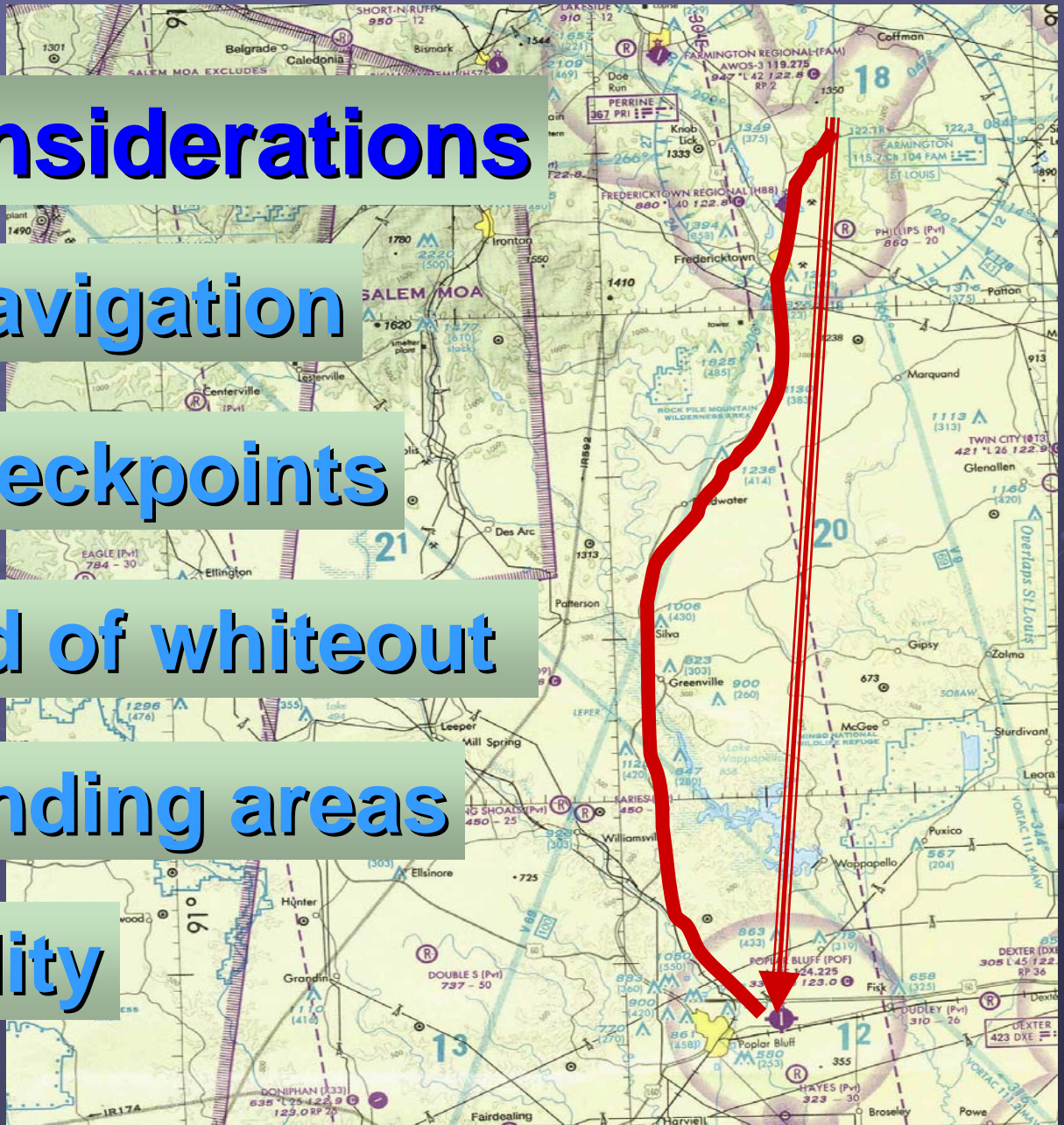
Ease of navigation

Visible checkpoints

Likelihood of whiteout

Forced landing areas

Survivability



Before COLD weather arrives



WINTER OPERATIONS



Service batteries before cold weather operations



The proper oil viscosity is important.



VS





WINTER OPERATIONS

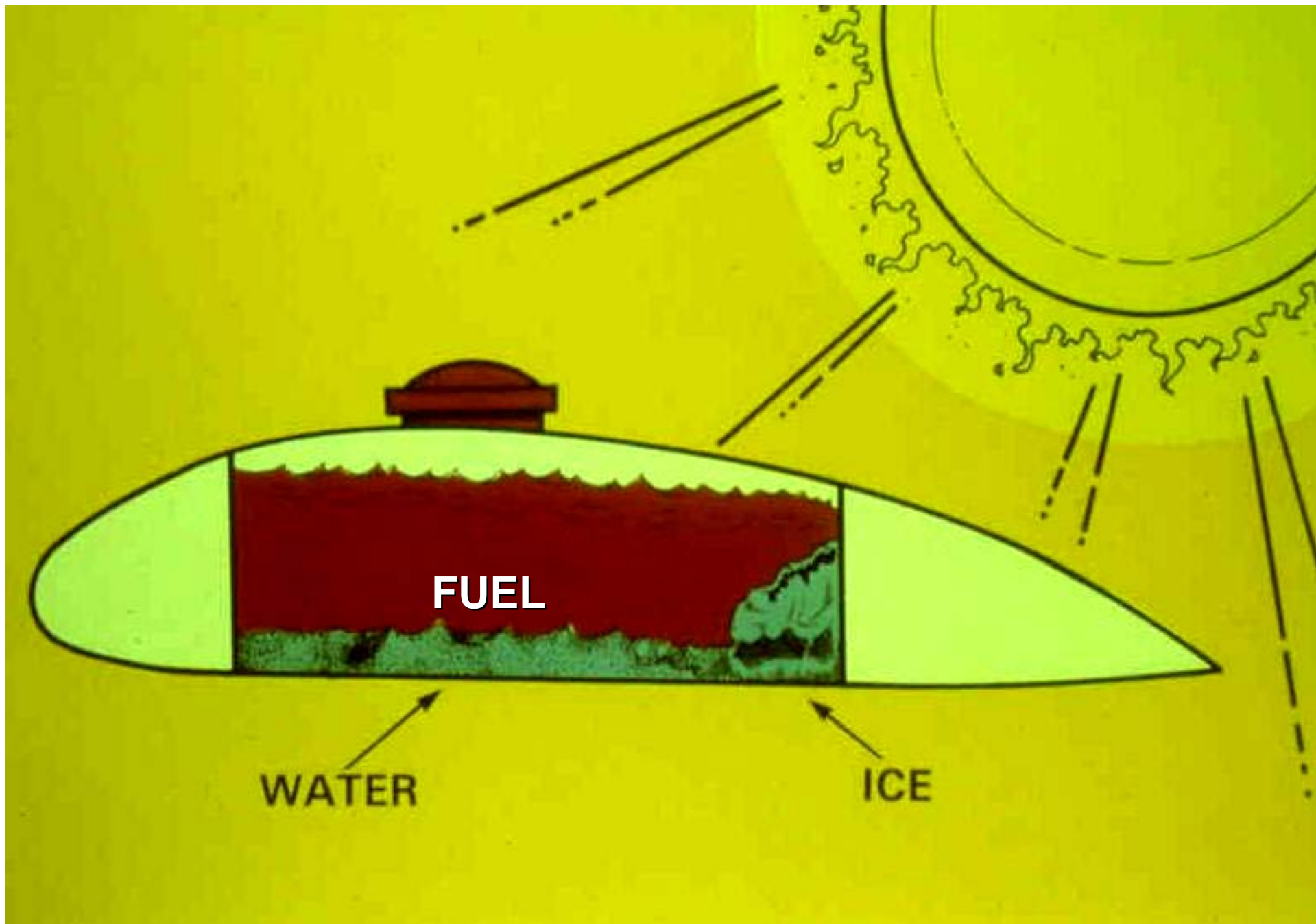


Wet Weather Pre-flight



WINTER OPERATIONS





WINTER OPERATIONS



Cold Weather Pre-flight

Cabin heating system

WINTER OPERATIONS



Types of preheat:

- **Engine compartment heaters - heats only the engine**
- **Oil Sump Heaters**
- **Cabin heaters - heat the cabin and instruments**
- **Hangar (heated)**

Cold Weather Pre-flight



WINTER OPERATIONS



How about frost?



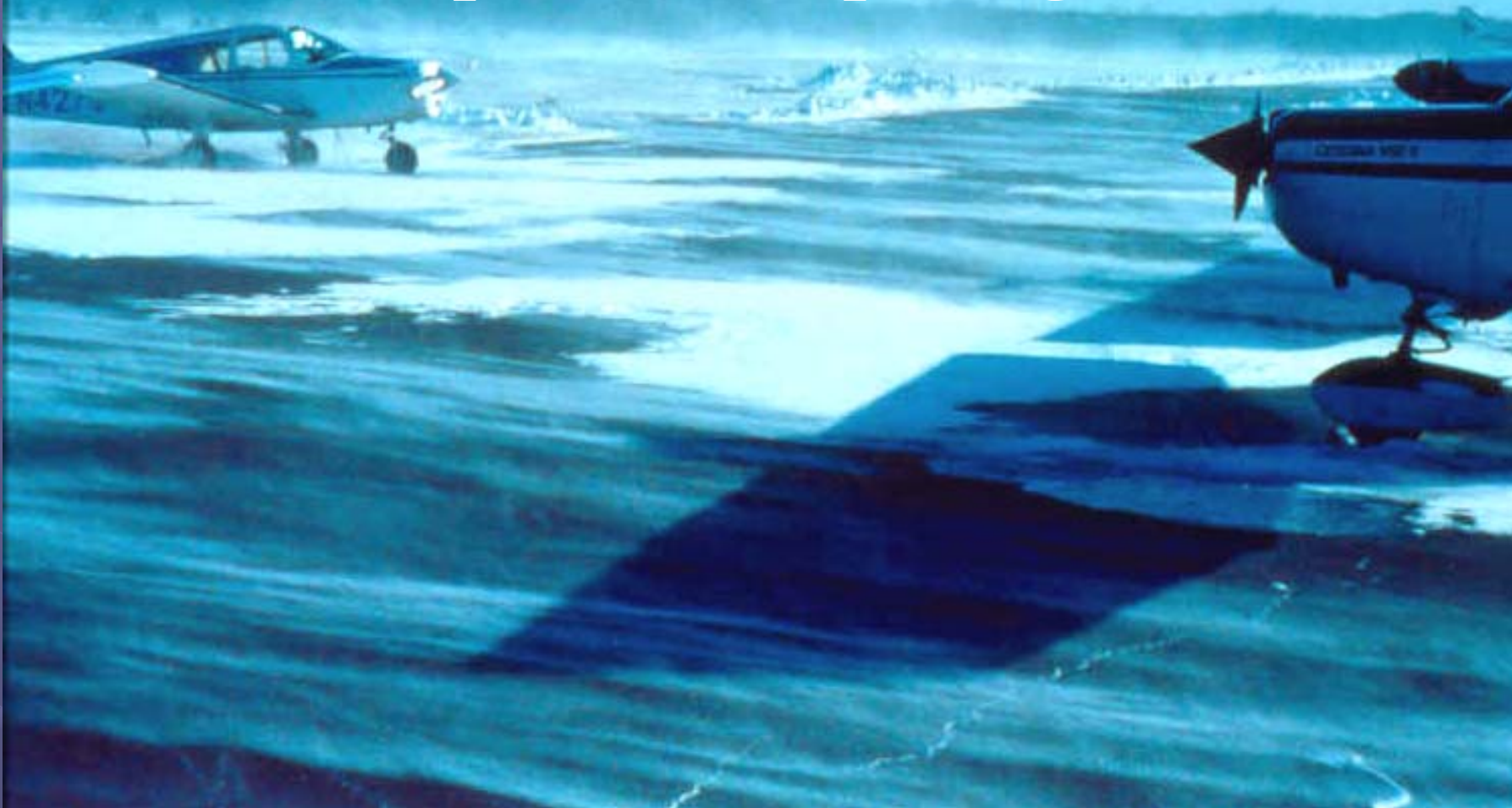
WINTER OPERATIONS





Don't depend on the defroster to
clear the windscreen

**Blowing snow collects in
unprotected openings.**



Preflight inspection



WINTER OPERATIONS



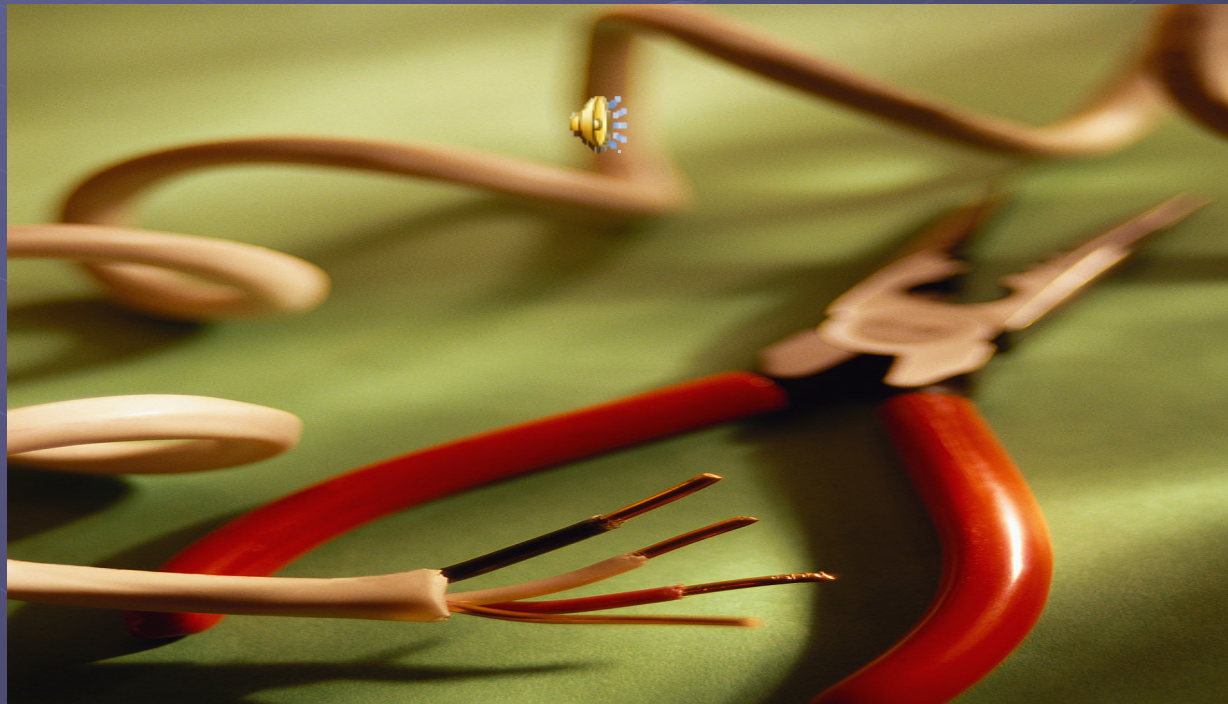
WINTER WEATHER FLYING TECHNIQUES

Preflight inspection



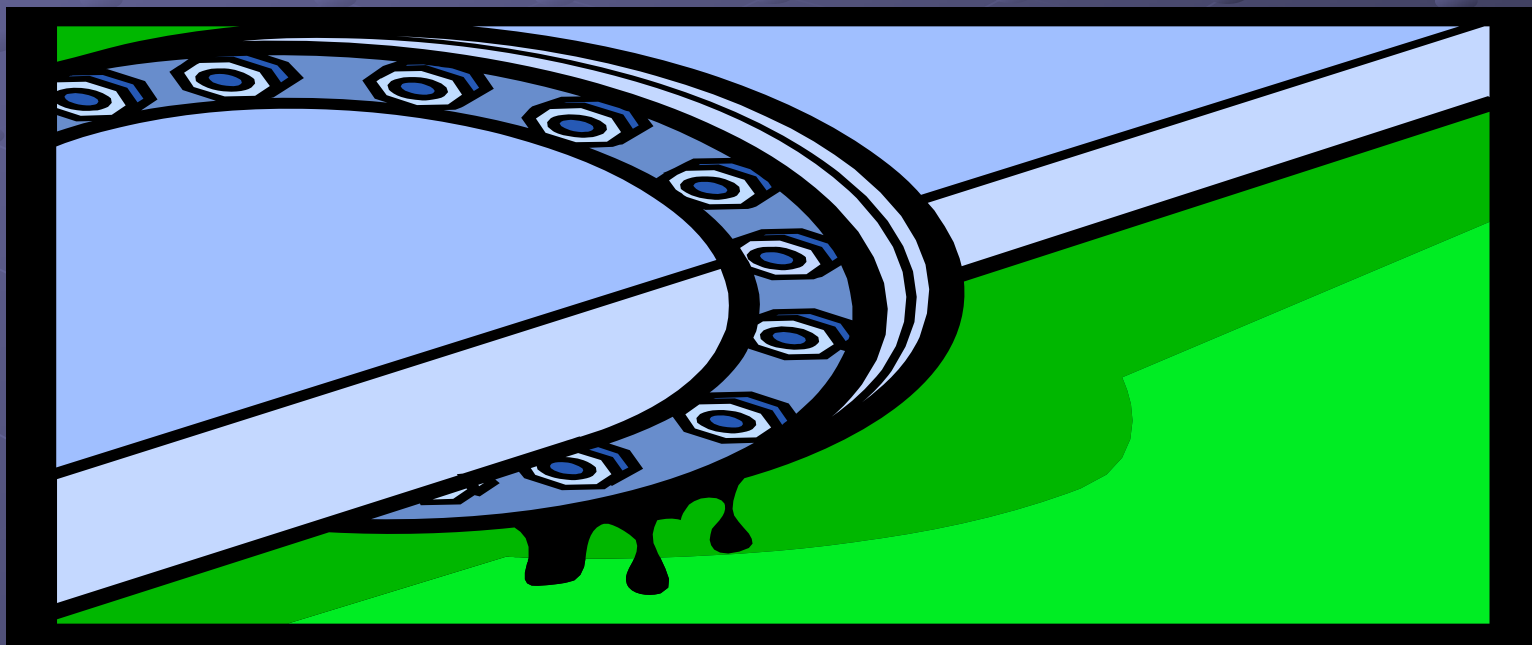
WINTER WEATHER FLYING TECHNIQUES

Preflight inspection



WINTER WEATHER FLYING TECHNIQUES

Preflight inspection





WINTER OPERATIONS



Starting



WINTER OPERATIONS





**Use caution after engine start
and during “Run-Up”**



Brakes may freeze



WINTER OPERATIONS



WINTER WEATHER FLYING TECHNIQUES

Starting (helicopter)



WINTER WEATHER FLYING TECHNIQUES



Prior to lifting or moving

An aerial photograph of a snowy landscape. A road or path runs horizontally across the middle of the frame. To the left of the road, there is a small, dark, rectangular building or structure. The ground is covered in snow, with some darker patches visible. The overall scene is a winter landscape.

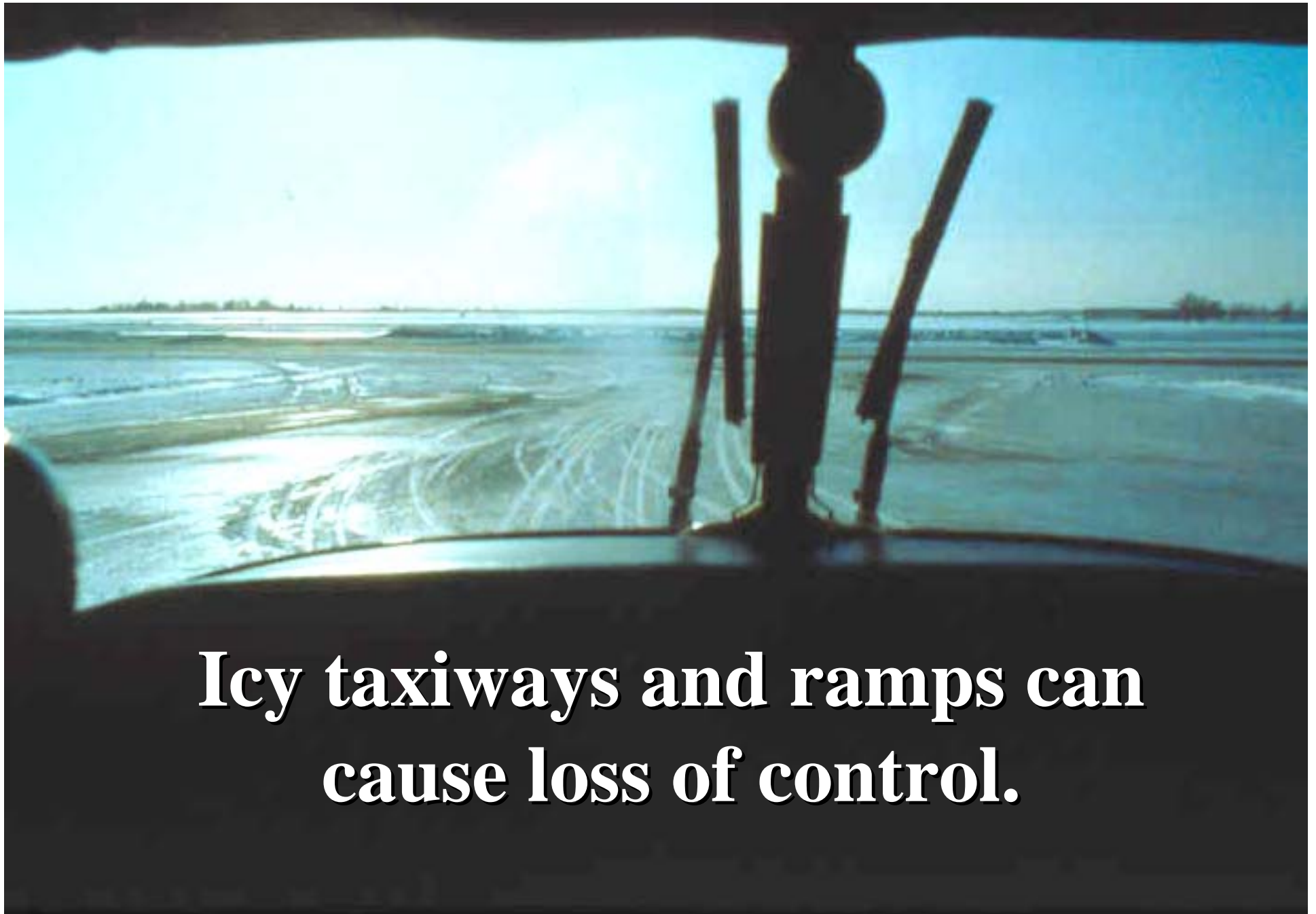
Winter TAXIING

WINTER OPERATIONS



WINTER WEATHER FLYING TECHNIQUES

Taxiing (Airplanes)



**Icy taxiways and ramps can
cause loss of control.**

Caution: Snow bank





Ice FOD !!



WINTER OPERATIONS





Taxi Technique

WINTER OPERATIONS



Reverse !



WINTER OPERATIONS

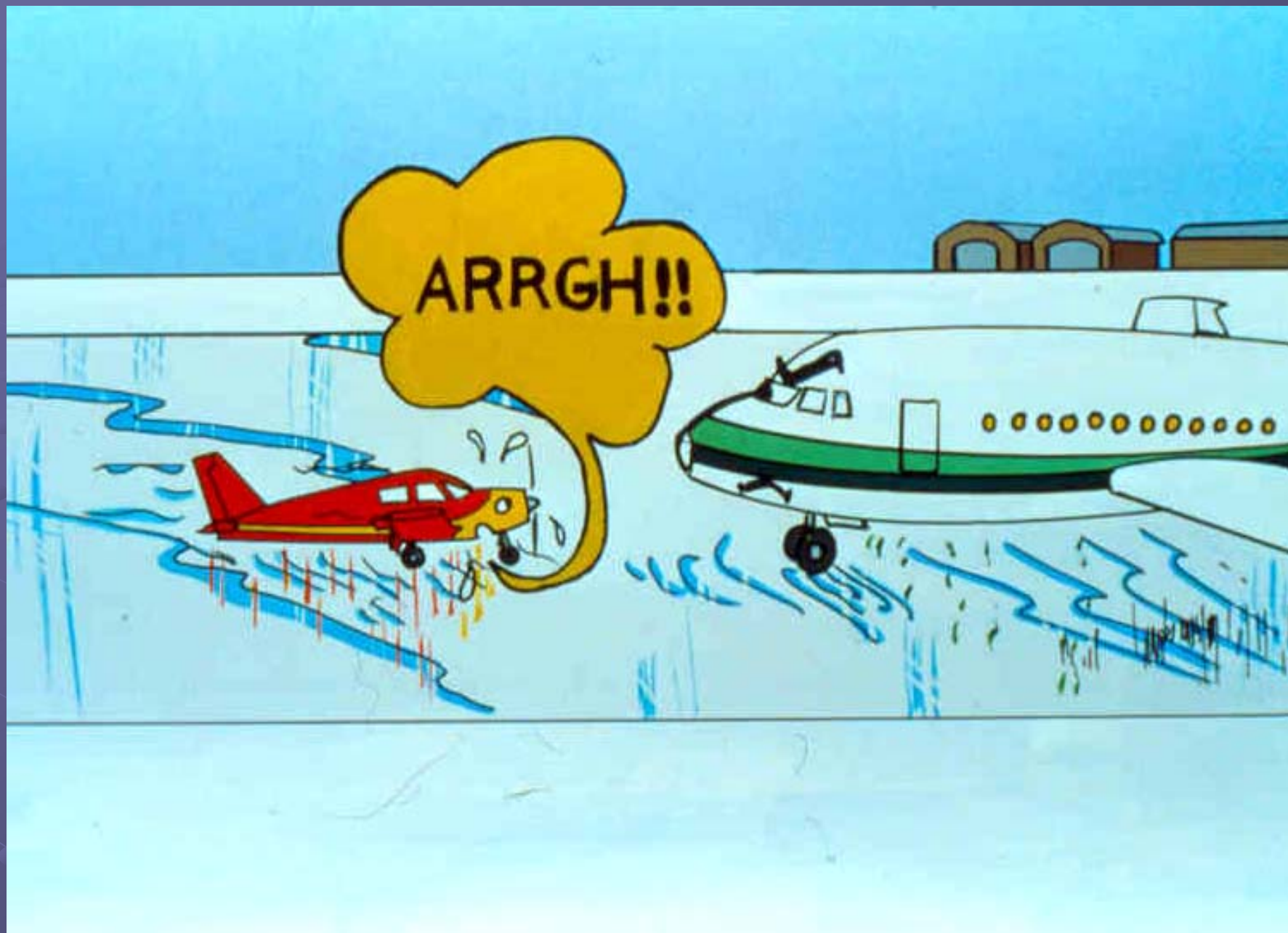


Whiteout



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WINTER OPERATIONS



Engine run-up.



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Deice equipment Operational ?



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Taxiing (Helicopters)



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Hovering



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TAKEOFF



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**Be prepared to abort if
skidding occurs.**

A small white propeller plane is flying over a snowy field. The background consists of a dense forest of bare trees under a clear blue sky. The plane is in the center of the frame, flying towards the left. The snow on the ground is bright white, and the trees are dark brown.

Refreezing Hazard

WINTER OPERATIONS





Retractable Gear

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WINTER OPERATIONS





Recycle the gear

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WINTER WEATHER FLYING TECHNIQUES

Takeoff (Helicopters)

Enroute considerations

WINTER WEATHER FLYING TECHNIQUES

Navigating



WINTER OPERATIONS



WINTER WEATHER FLYING TECHNIQUES

● ICE Accumulation potential



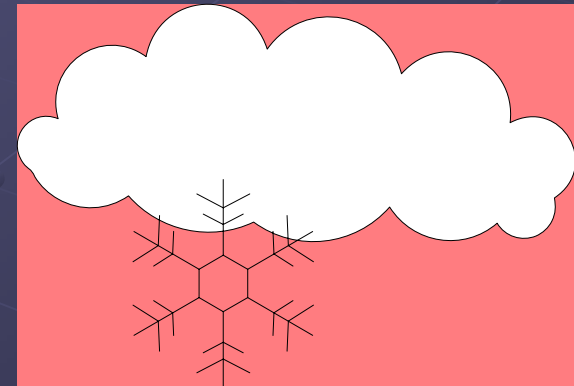
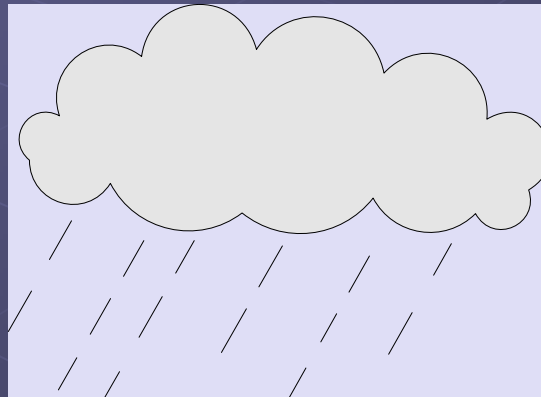
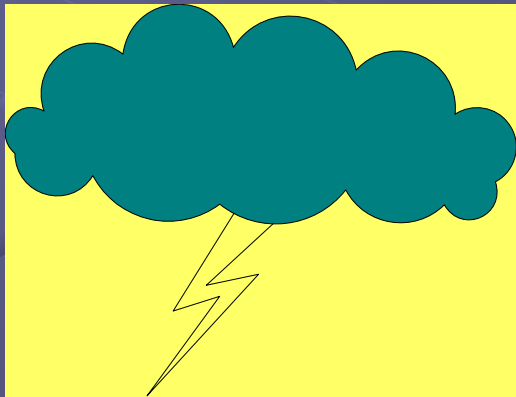
WINTER WEATHER FLYING TECHNIQUES

- ICE Considerations



CLIMATE AND WEATHER

- Rapidly changing weather



accident records show:

SOME PILOTS WILL FLY...

IN ANY KIND OF WEATHER



WINTER OPERATIONS





WINTER OPERATIONS





WINTER OPERATIONS





WINTER OPERATIONS





WINTER OPERATIONS





WINTER OPERATIONS





WINTER OPERATIONS



**Maintain Adequate
fuel reserves.**

Give yourself Options

WINTER OPERATIONS



Always Leave Yourself an Out



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Loss of Visual References



HELP!!!



WINTER OPERATIONS



ICE FOG



WINTER OPERATIONS

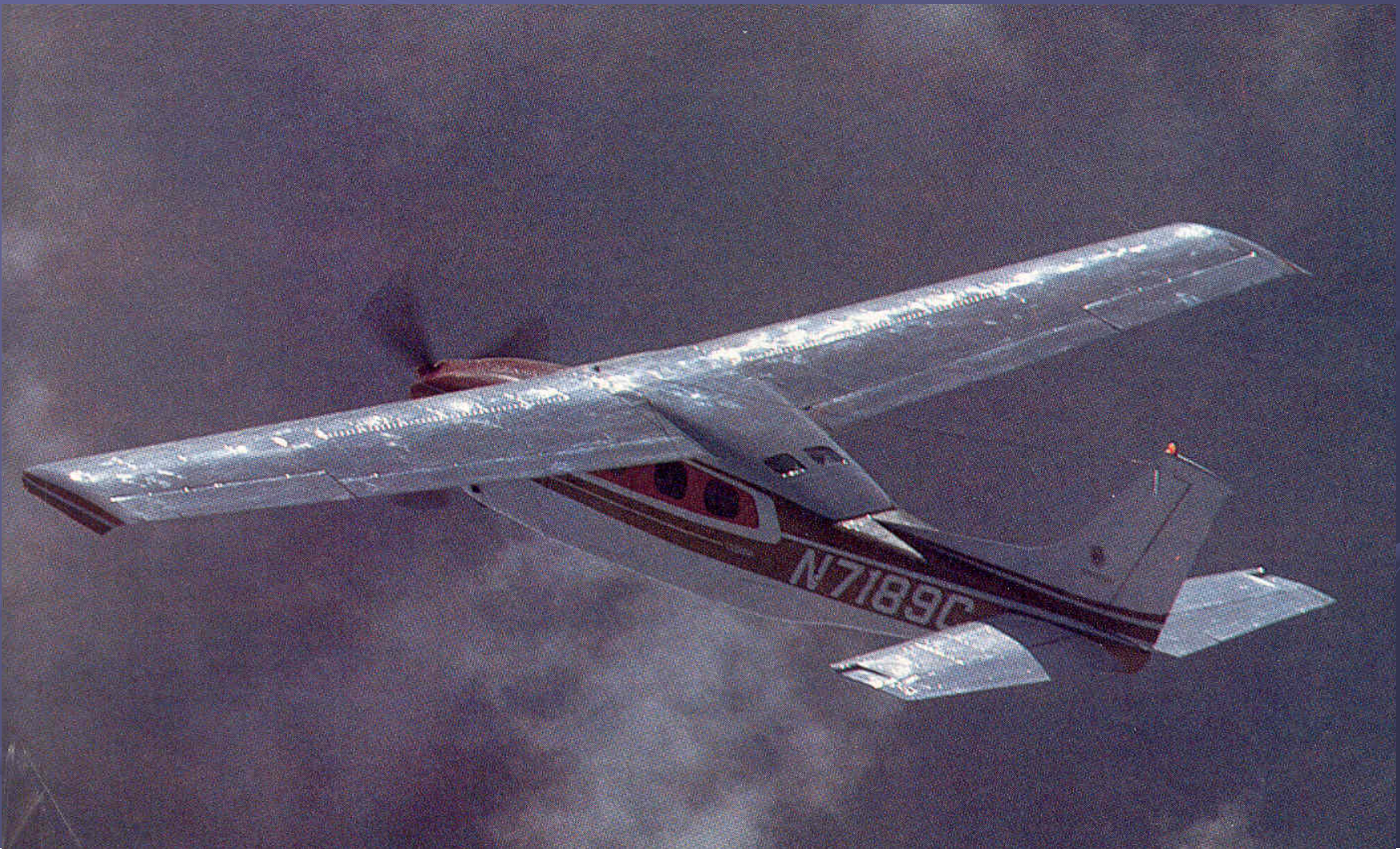




WINTER OPERATIONS

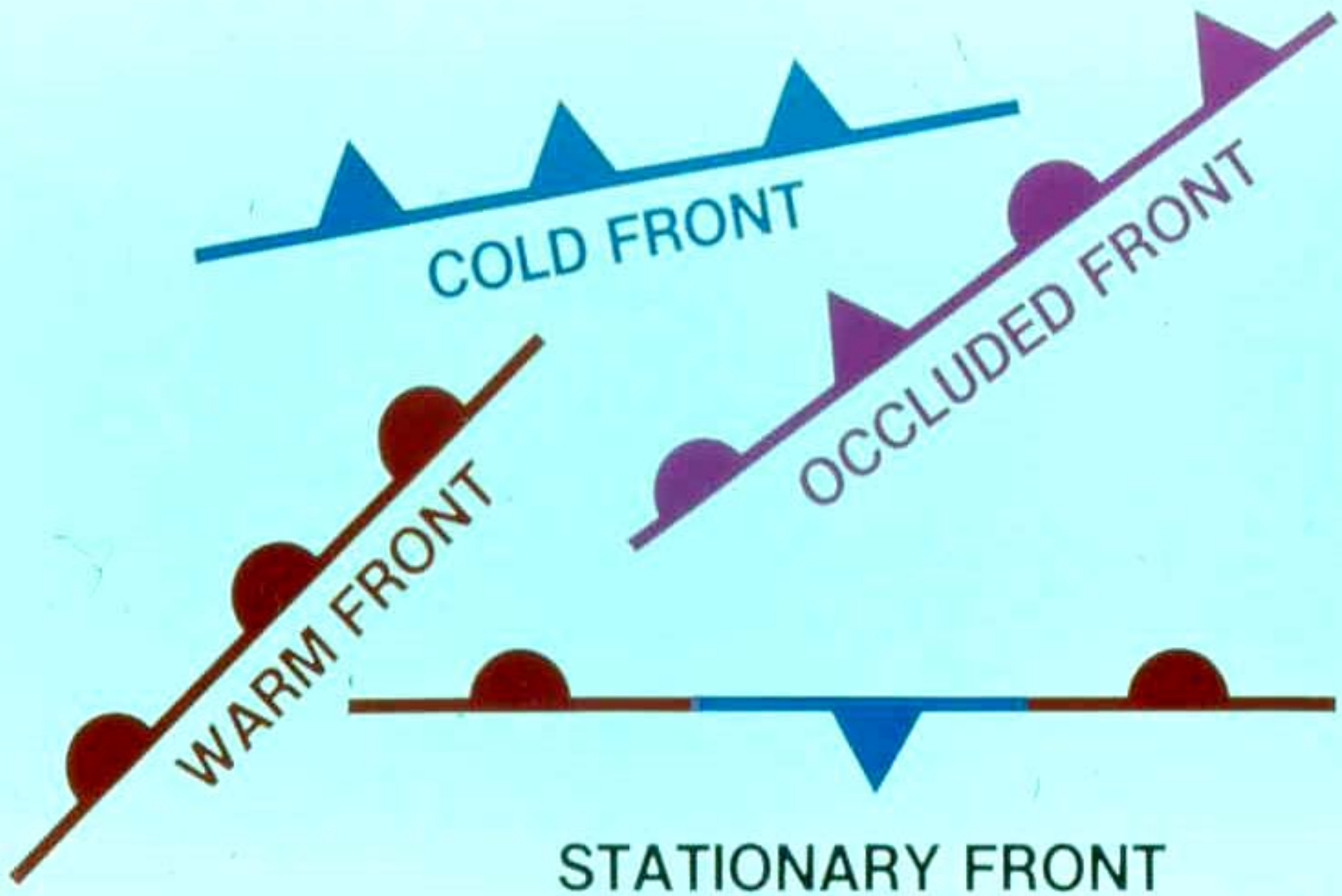


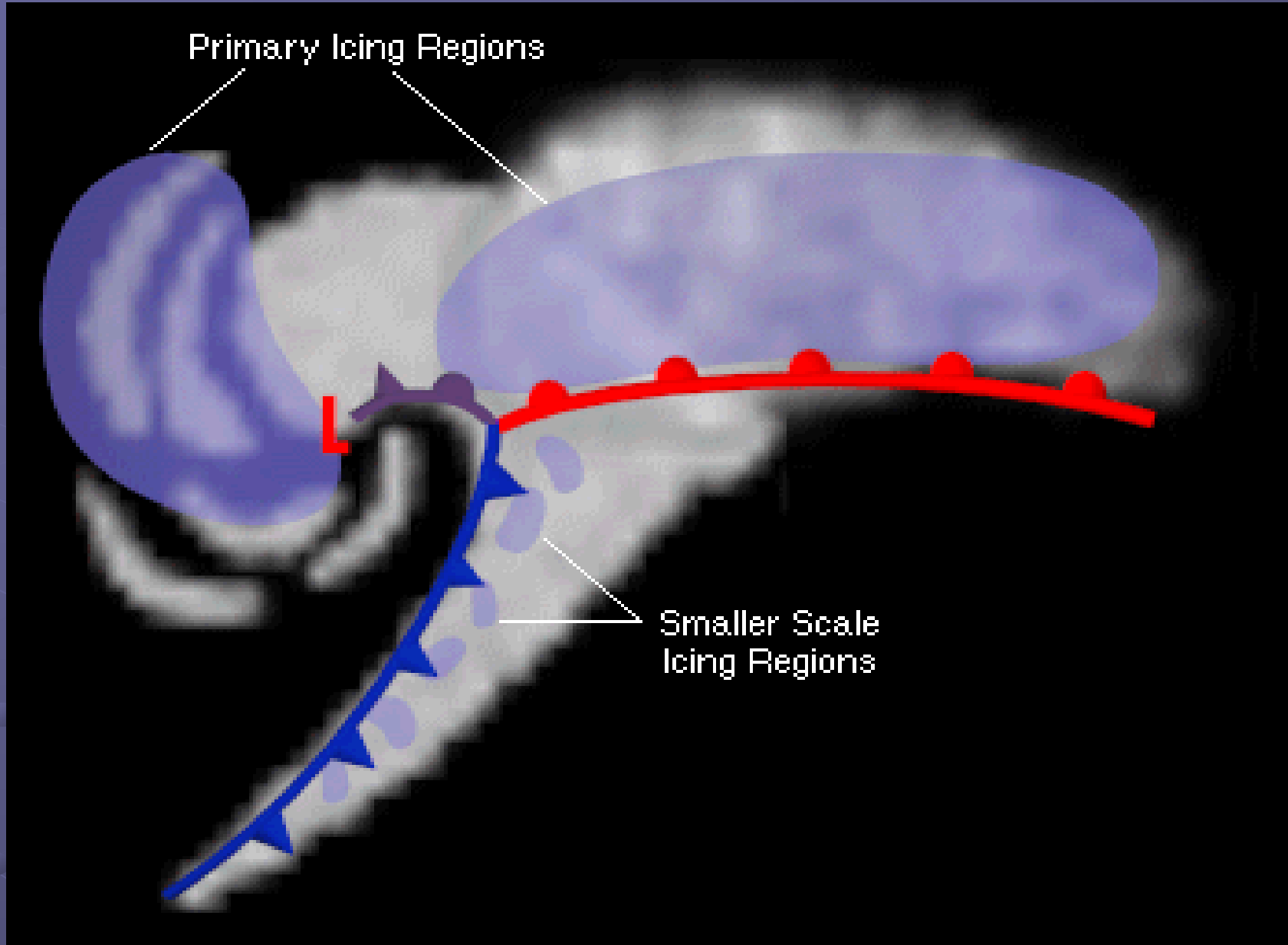
STRUCTURAL ICING



WINTER OPERATIONS

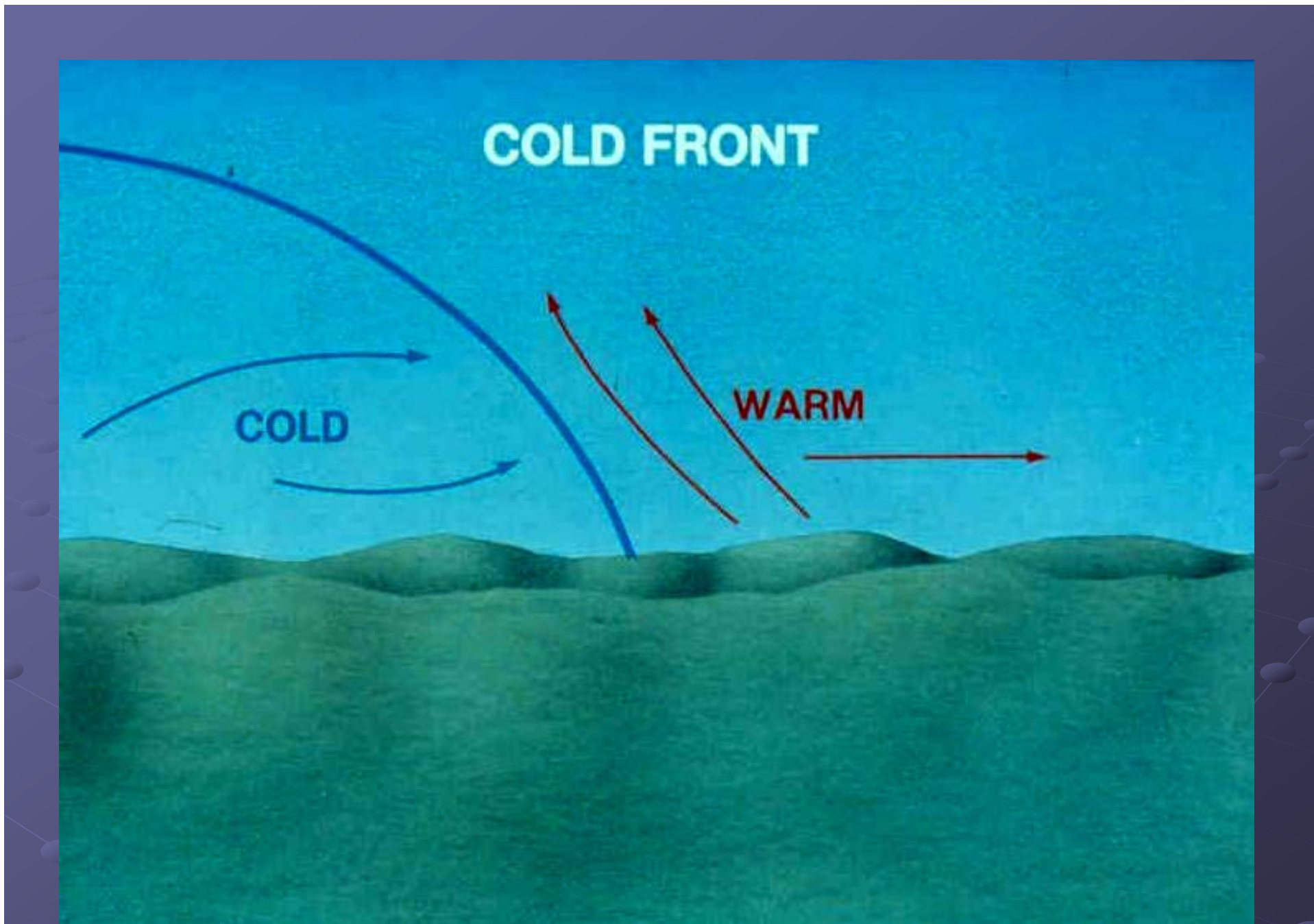


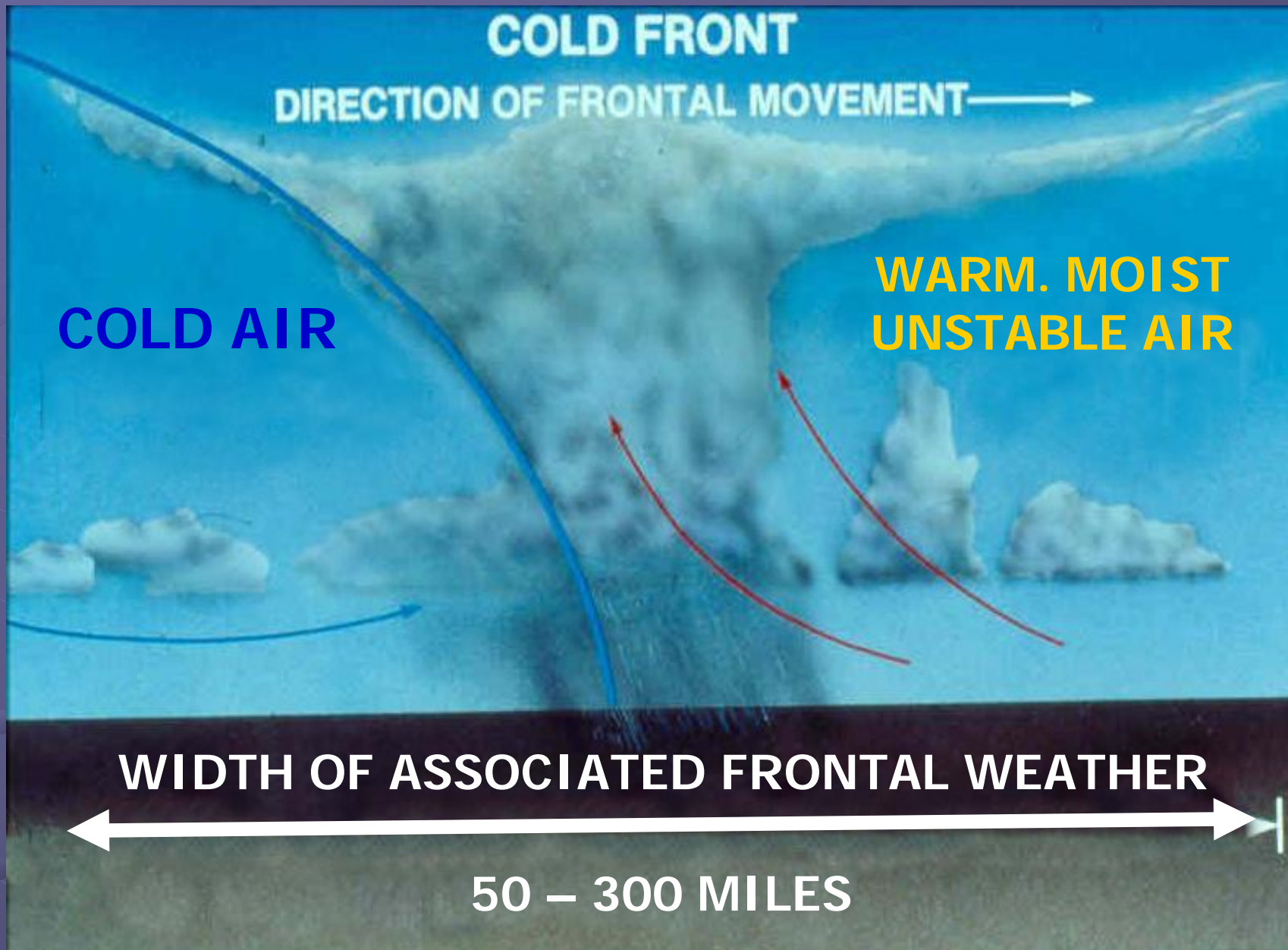


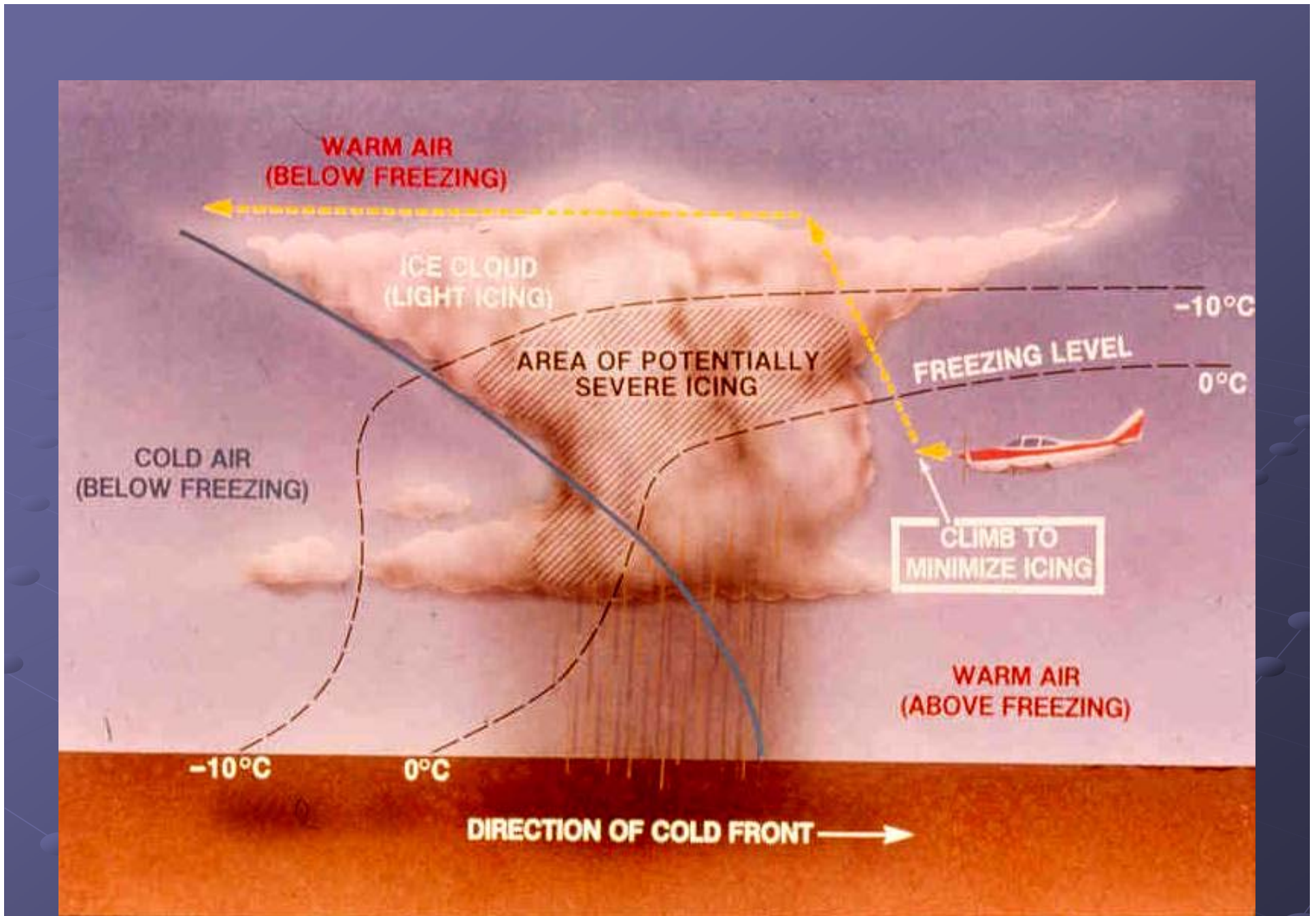


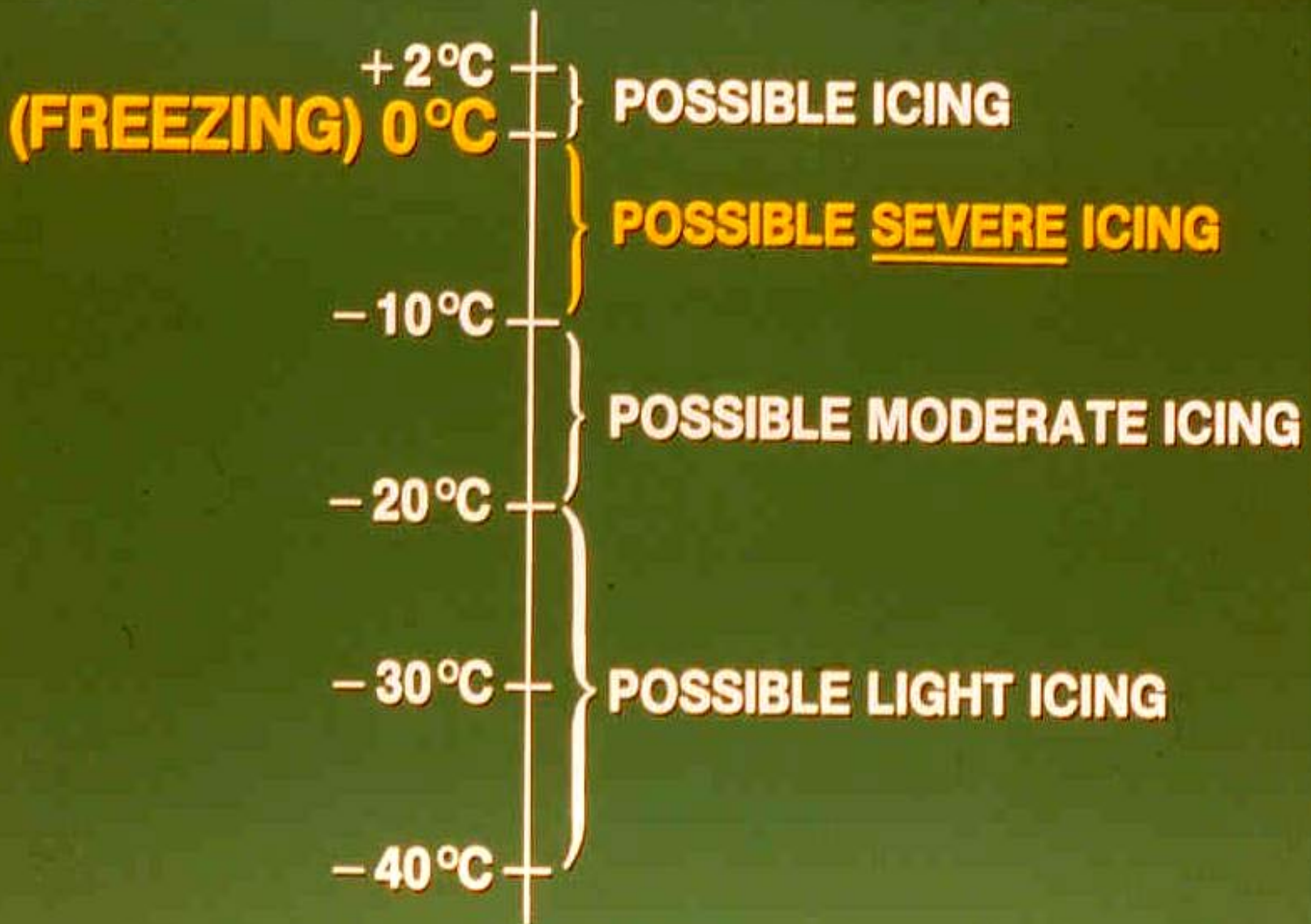
WINTER OPERATIONS













WINTER OPERATIONS





WINTER OPERATIONS





WINTER OPERATIONS



PLANNED ROUTE →

CAUTION: CHECK PRE-FRONTAL
WEATHER FOR CB'S, SQUALL
LINES, ETC.

APPROACHING
COLD FRONT →

ALTER COURSE
AWAY FROM FRONT

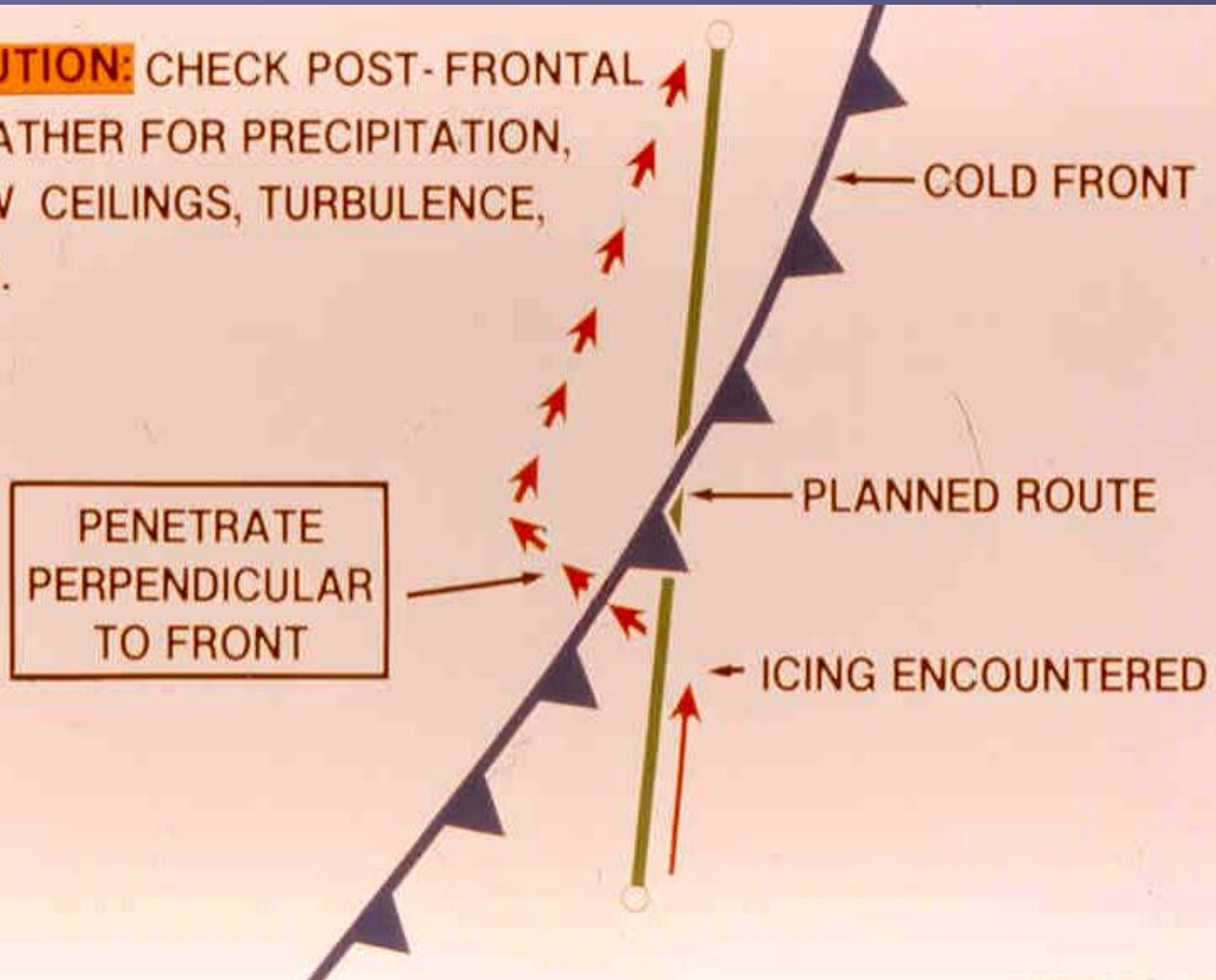
← ICING ENCOUNTERED

DON'T



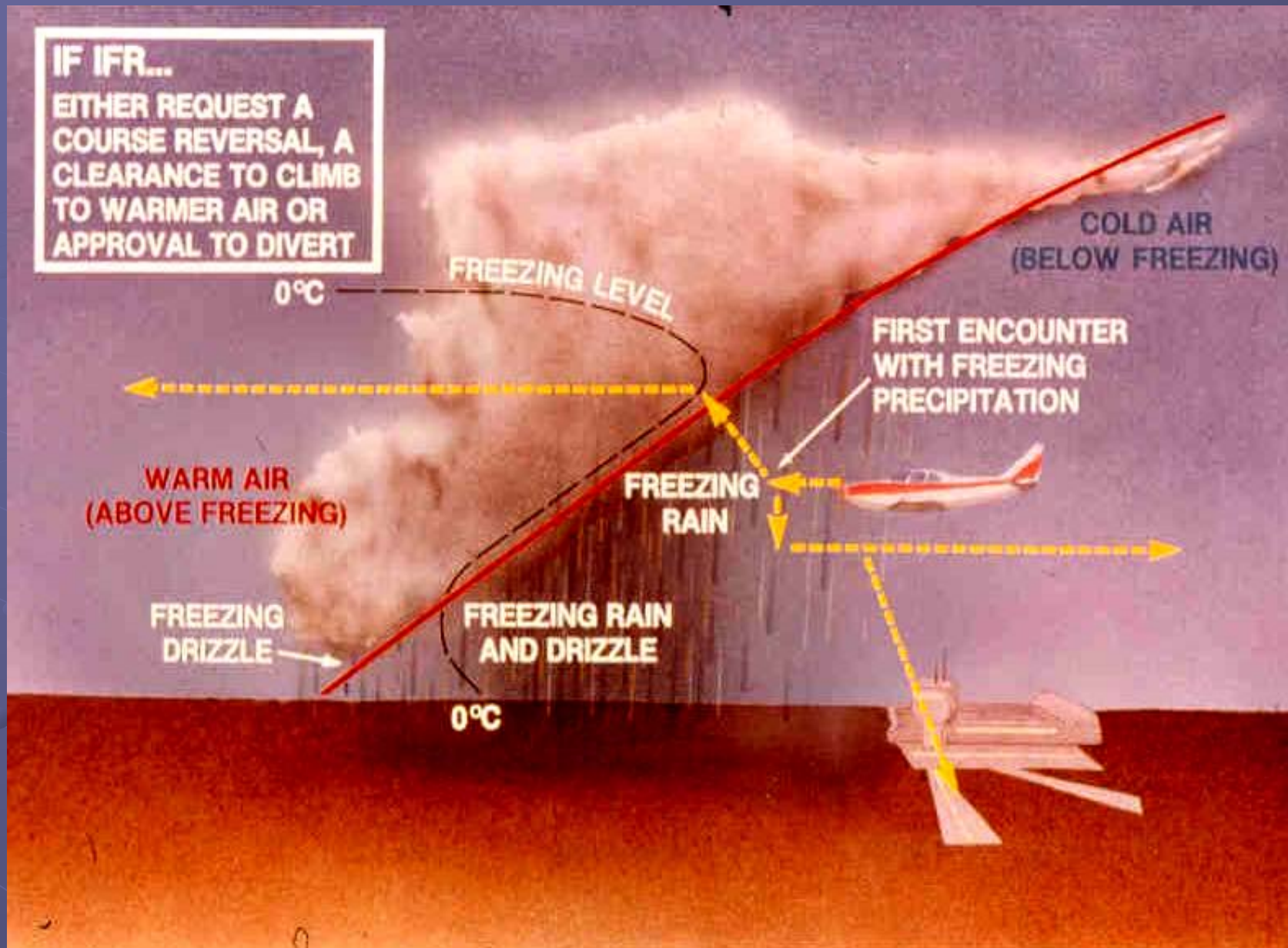
Fly parallel to a front under icing conditions

CAUTION: CHECK POST-FRONTAL
WEATHER FOR PRECIPITATION,
LOW CEILINGS, TURBULENCE,
ETC.



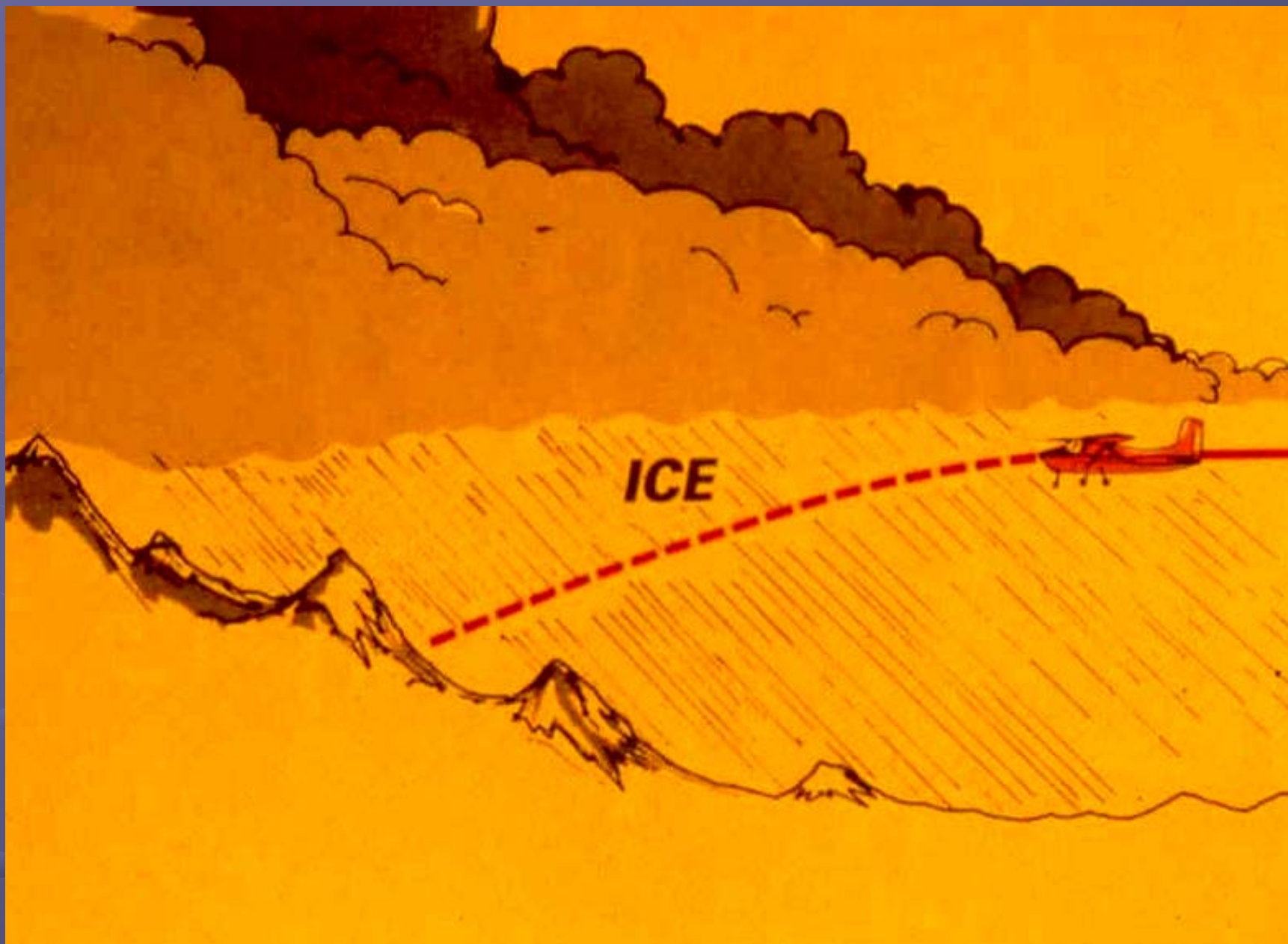
IF IFR...

**EITHER REQUEST A
COURSE REVERSAL, A
CLEARANCE TO CLIMB
TO WARMER AIR OR
APPROVAL TO DIVERT**



WINTER OPERATIONS





WINTER OPERATIONS



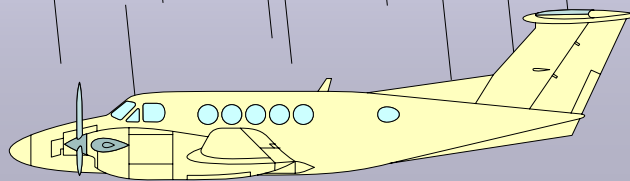
FREEZING RAIN

WARM AIR

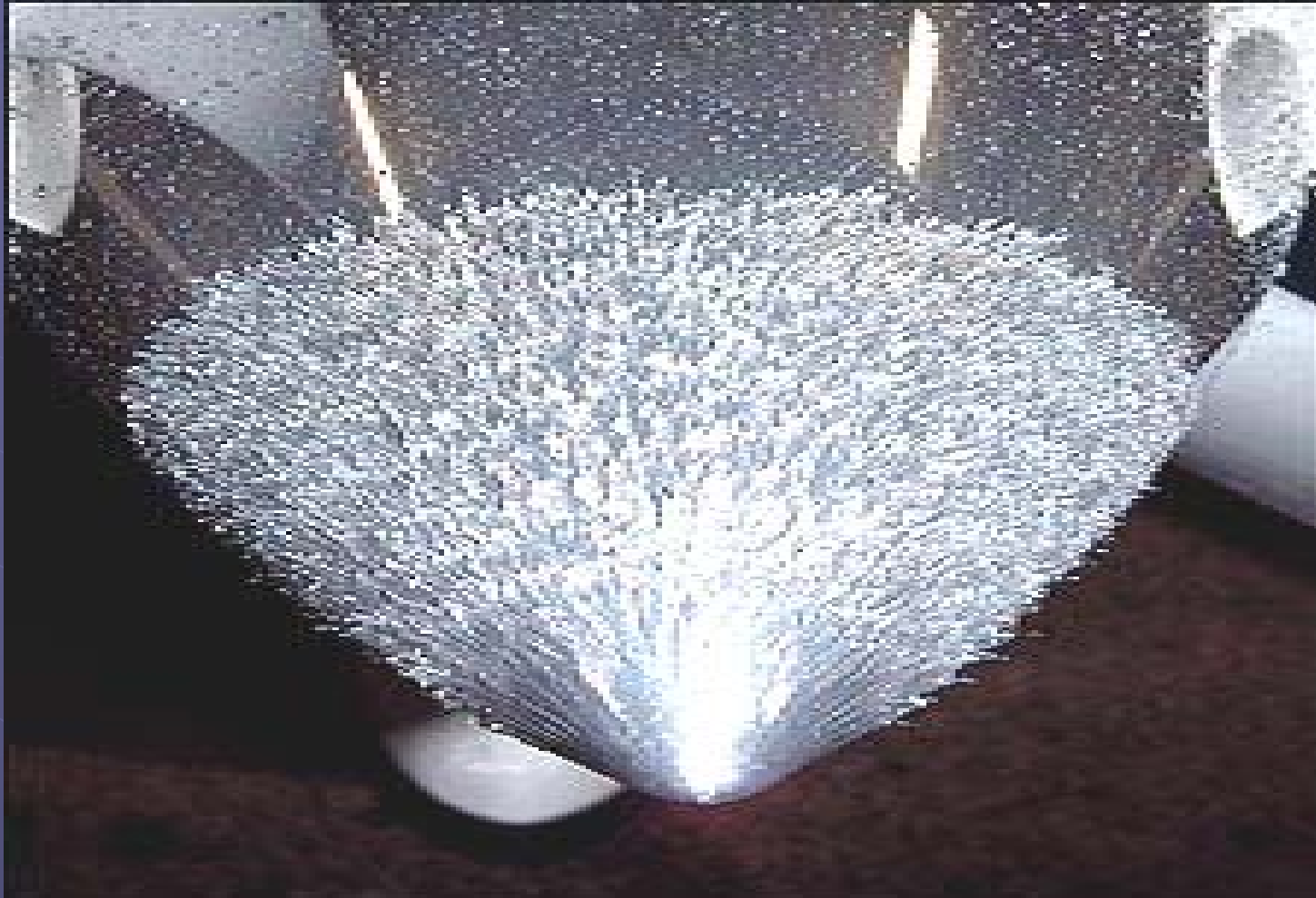
RAIN

COLD AIR

FREEZING RAIN



STRUCTURAL ICING



WINTER OPERATIONS



**RELATIVE
WIND** →

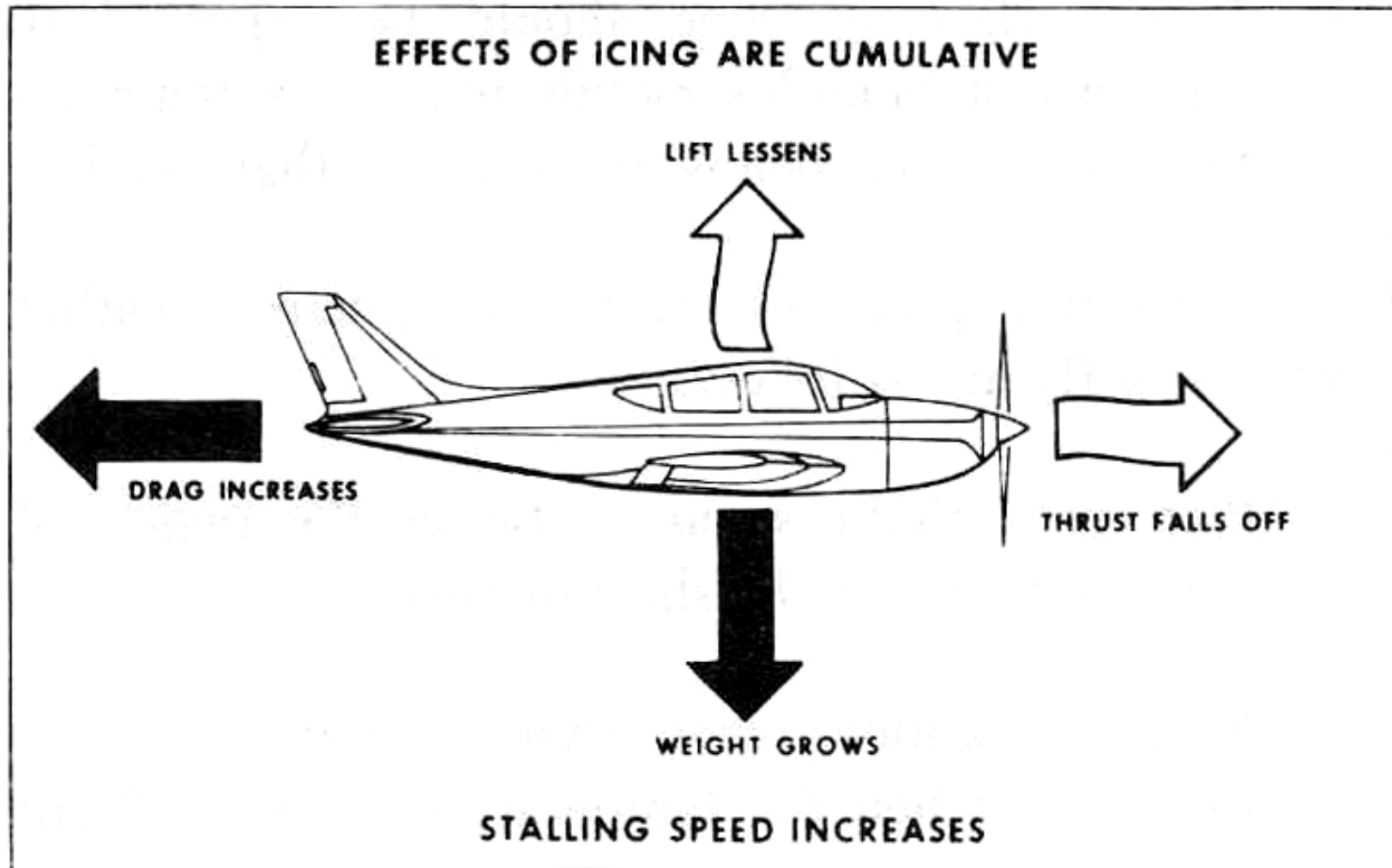


**LOW ANGLE OF
ATTACK (CRUISE
AIRSPEEDS)**

**RELATIVE
WIND** →



**HIGH ANGLE OF
ATTACK (SLOW
AIRSPEEDS)**

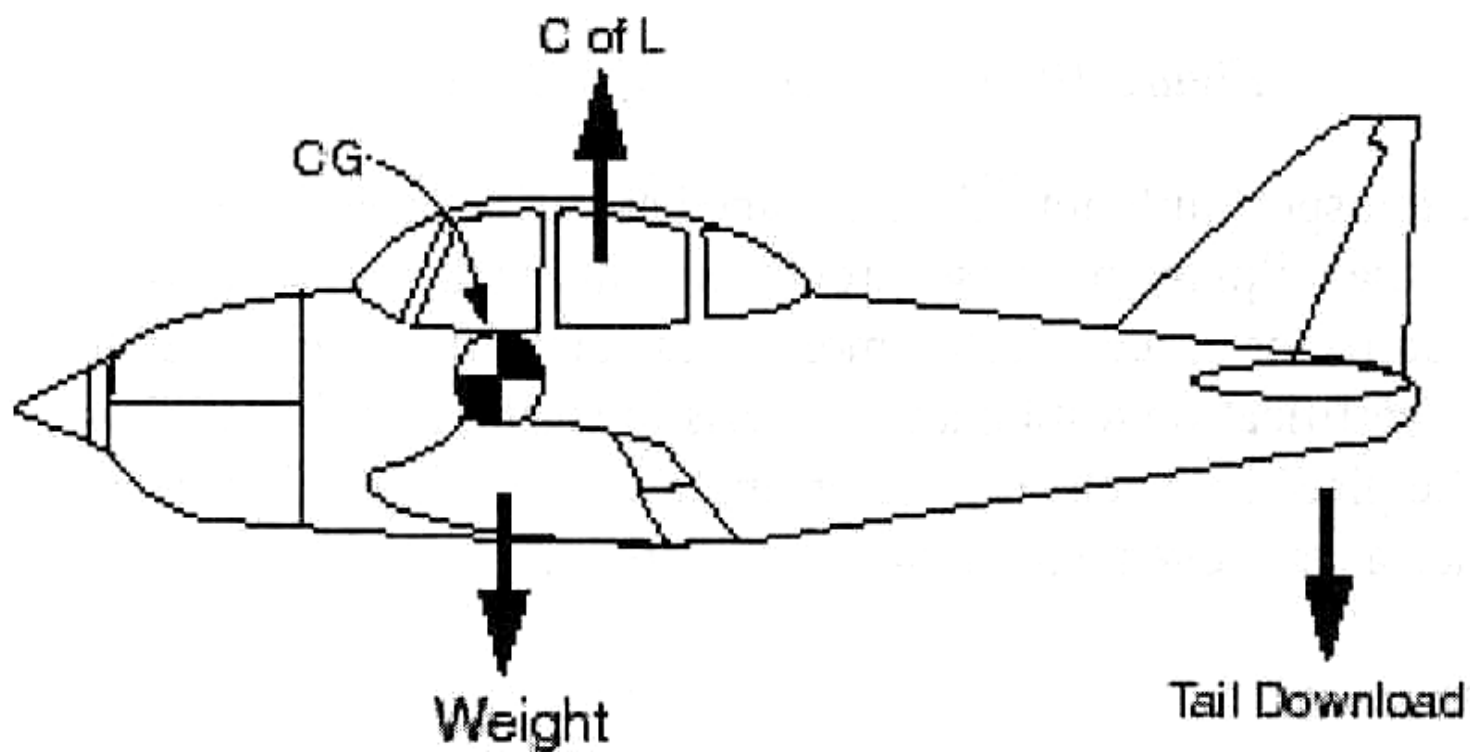


Effects of icing.

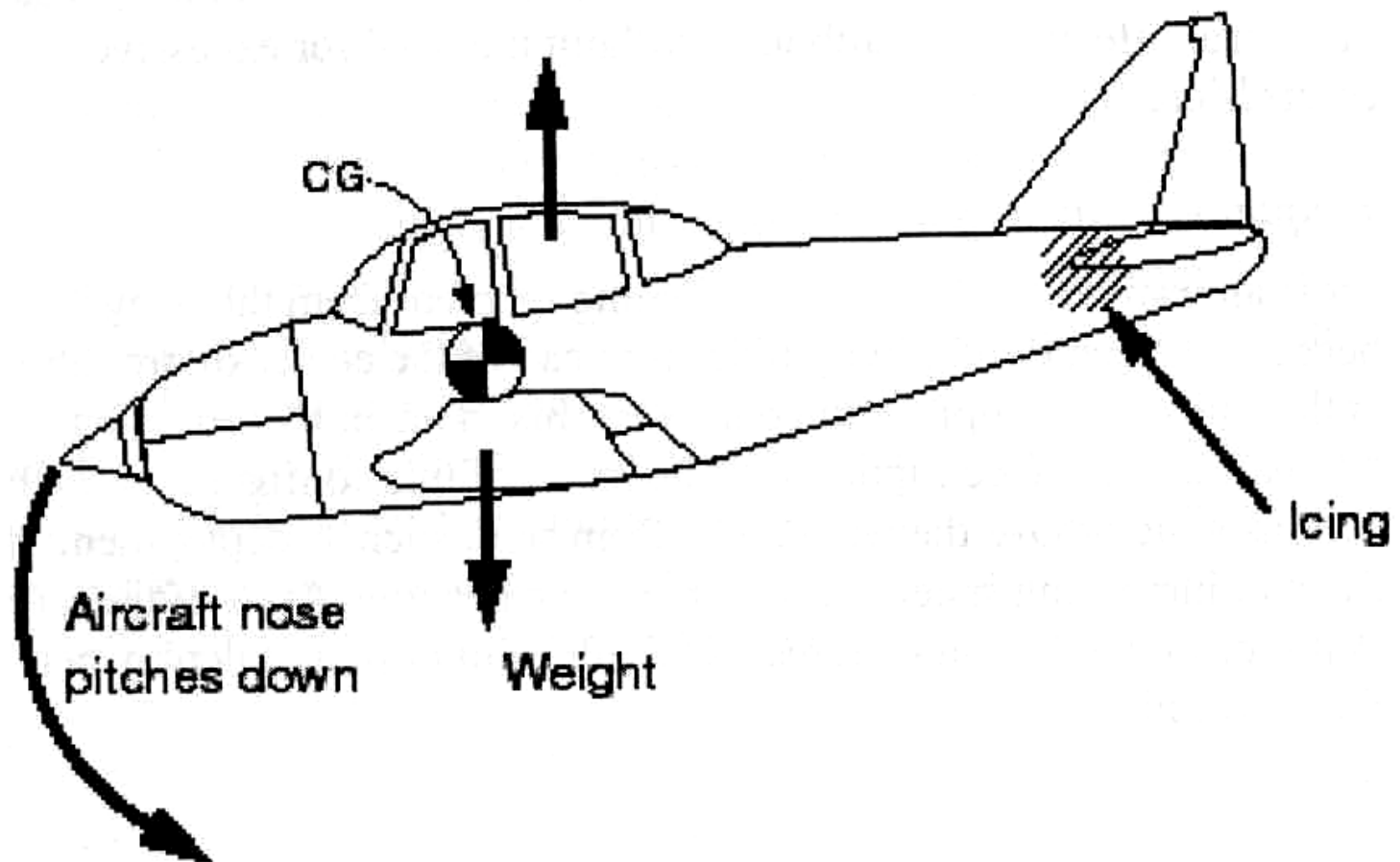


WINTER OPERATIONS





Tail down moment.



Pitchover due to tail stall.

STRUCTURAL ICING • Helicopter



DON'T

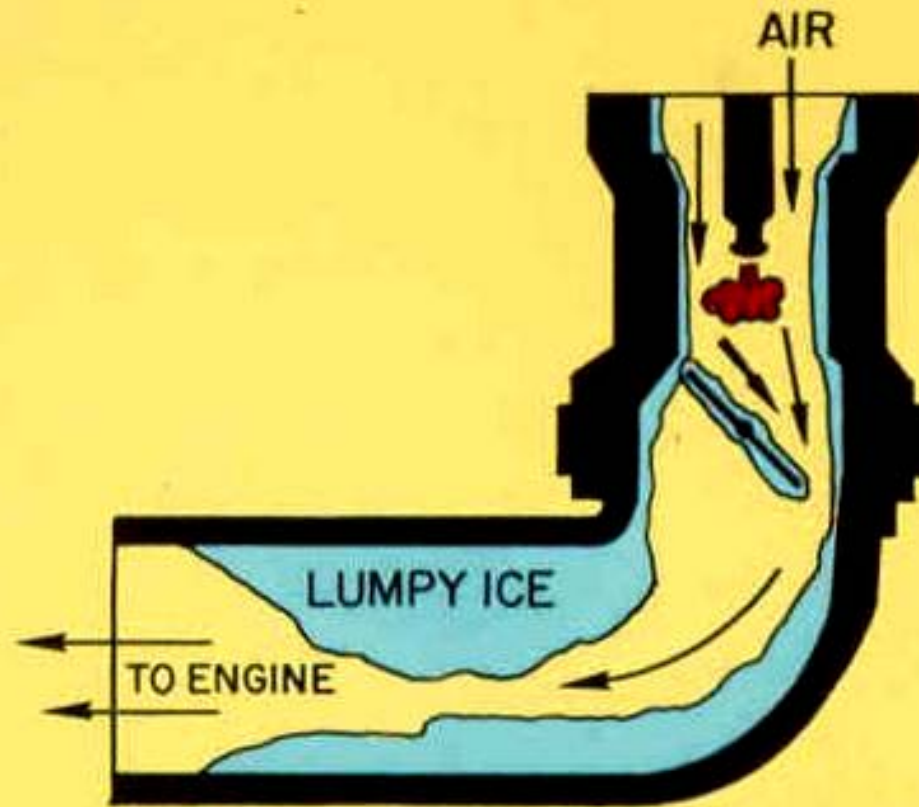


Fly into cumulus clouds at
low temperature



WINTER OPERATIONS





Carburetor Icing



WINTER OPERATIONS




Intake Icing

- Fuel injected aircraft do not have carburetors, but the air intake may become contaminated with ice.
- Alternate air provides a source of heated air from around the engine.

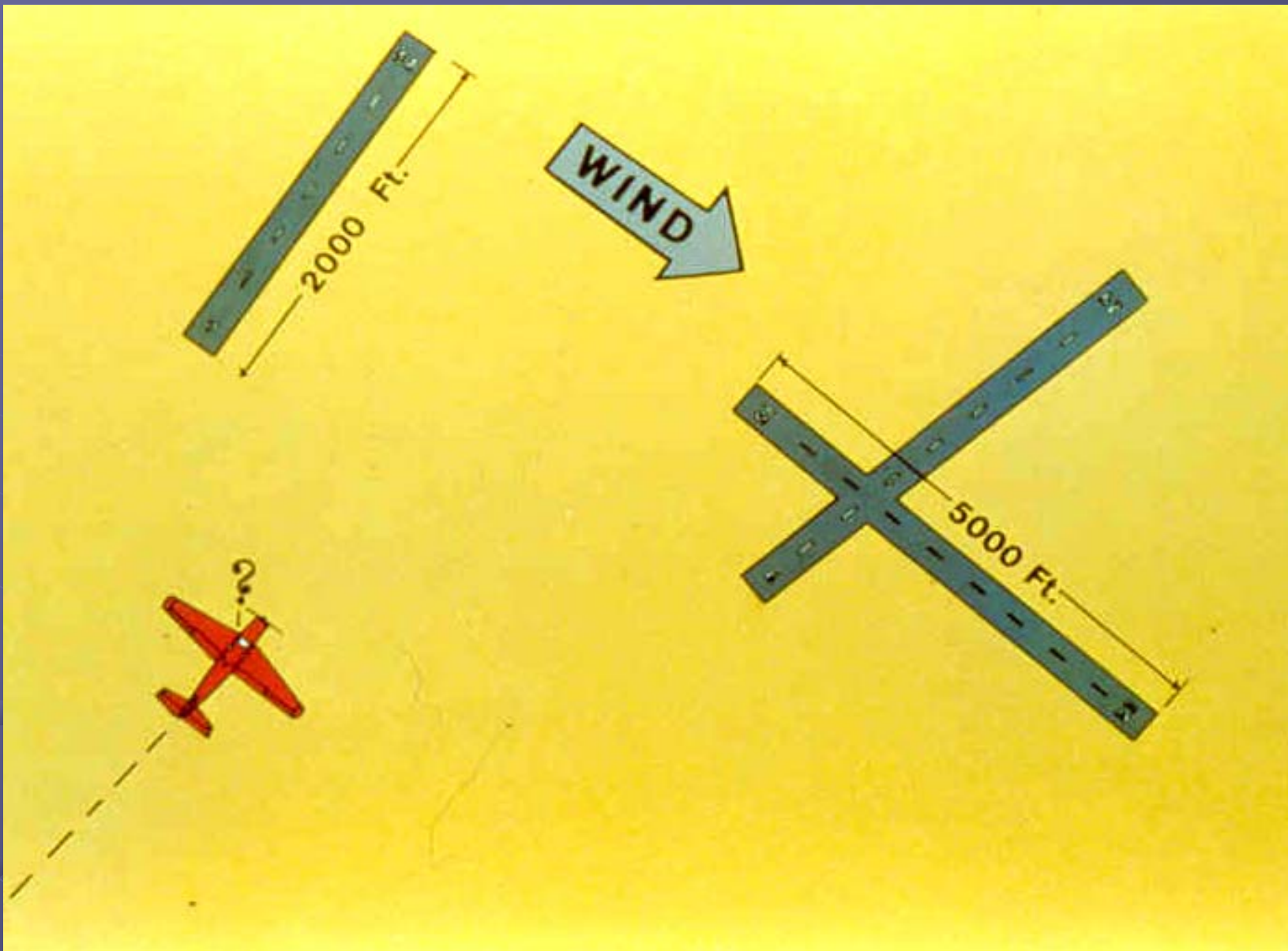
Landing with ice on the aircraft





LANDING ON WET, ICY AND SNOW-COVERED RUNWAYS

**Braking efficiency can drop to zero
on a wet or ice covered runway**



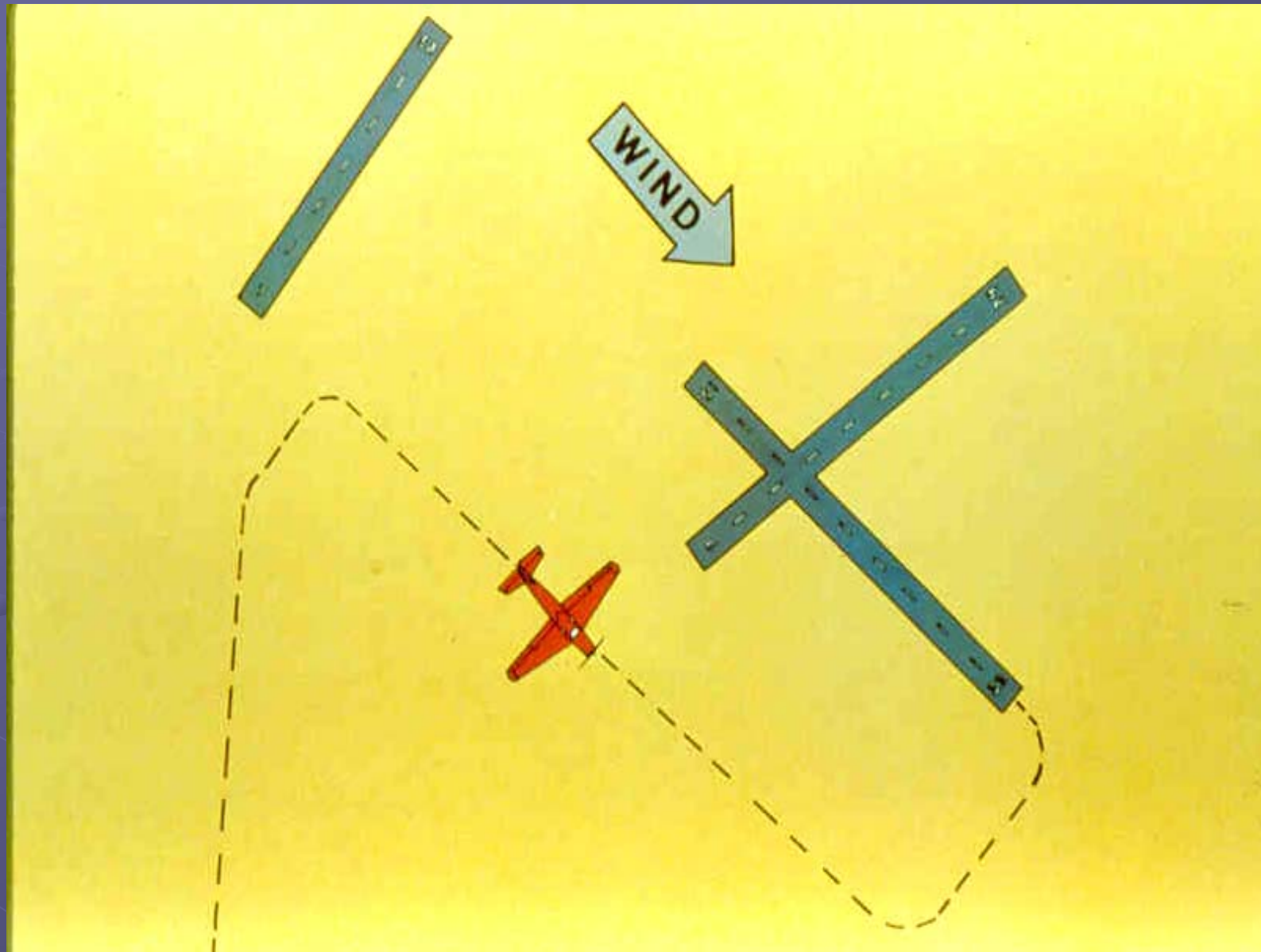
WINTER OPERATIONS





WINTER OPERATIONS





WINTER OPERATIONS



Select a visual reference point that will be visible during touchdown.

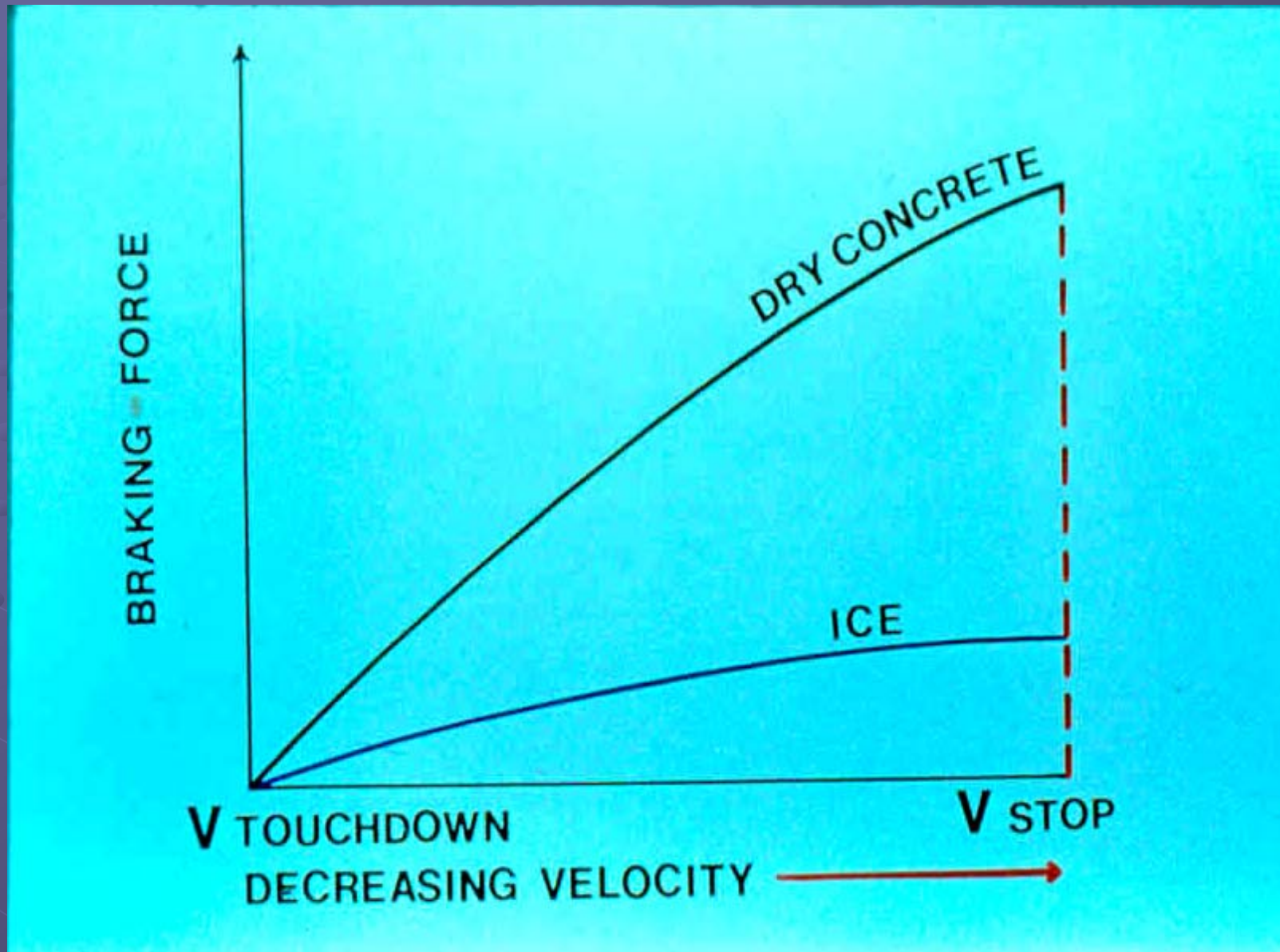


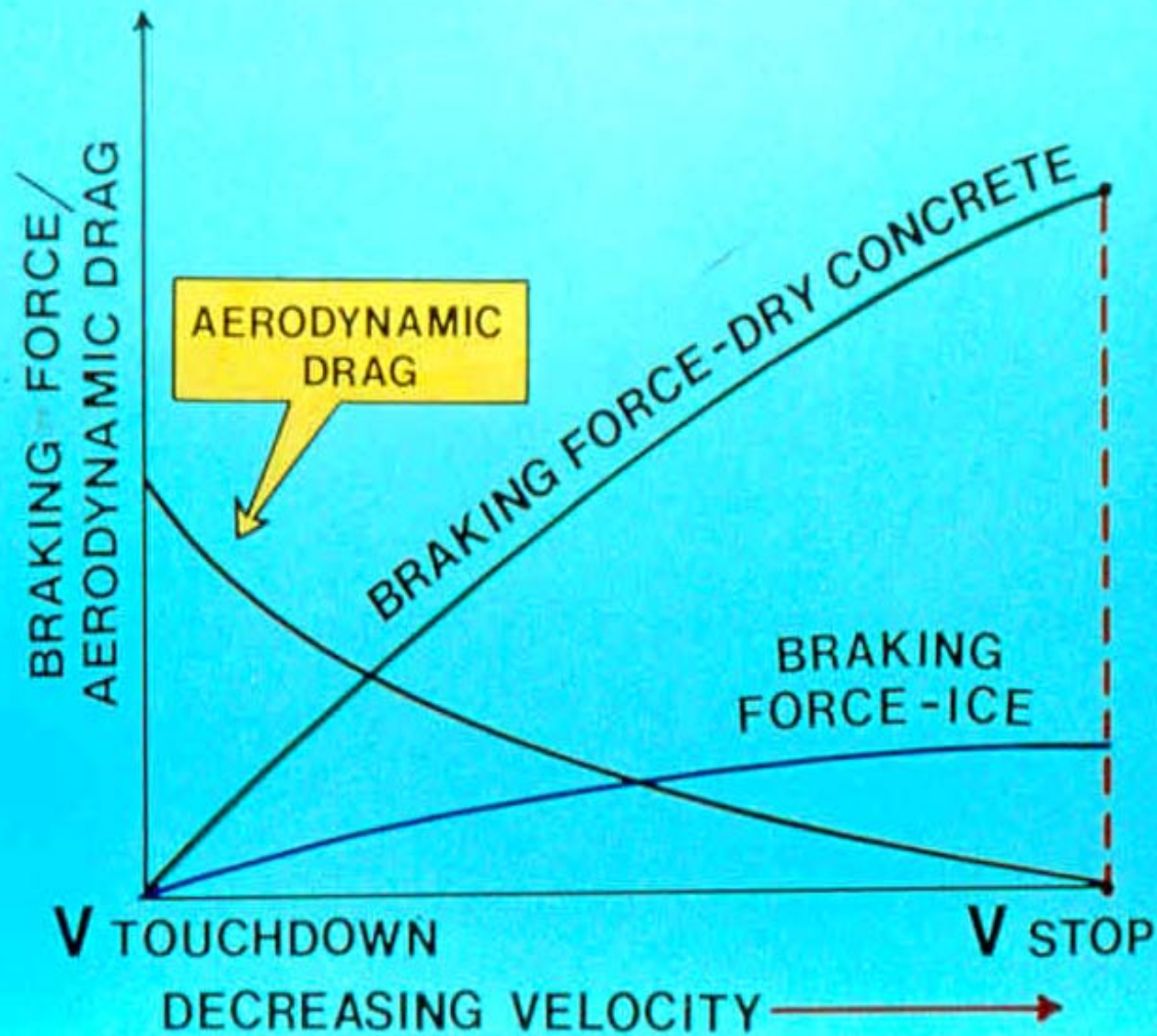


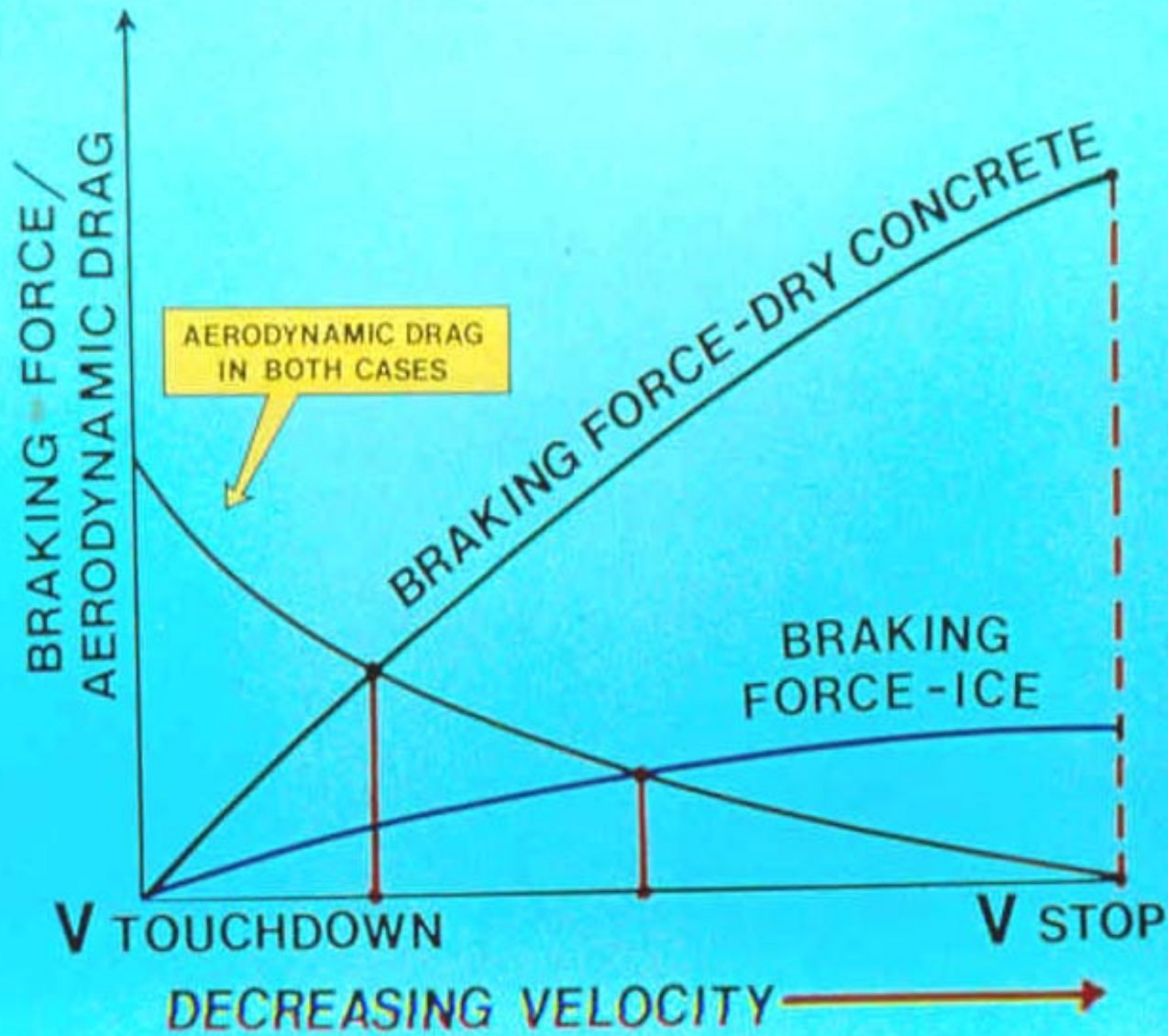
**Take full advantage of
aerodynamic braking.**

**Apply even brake pressure
but do not lock wheels**

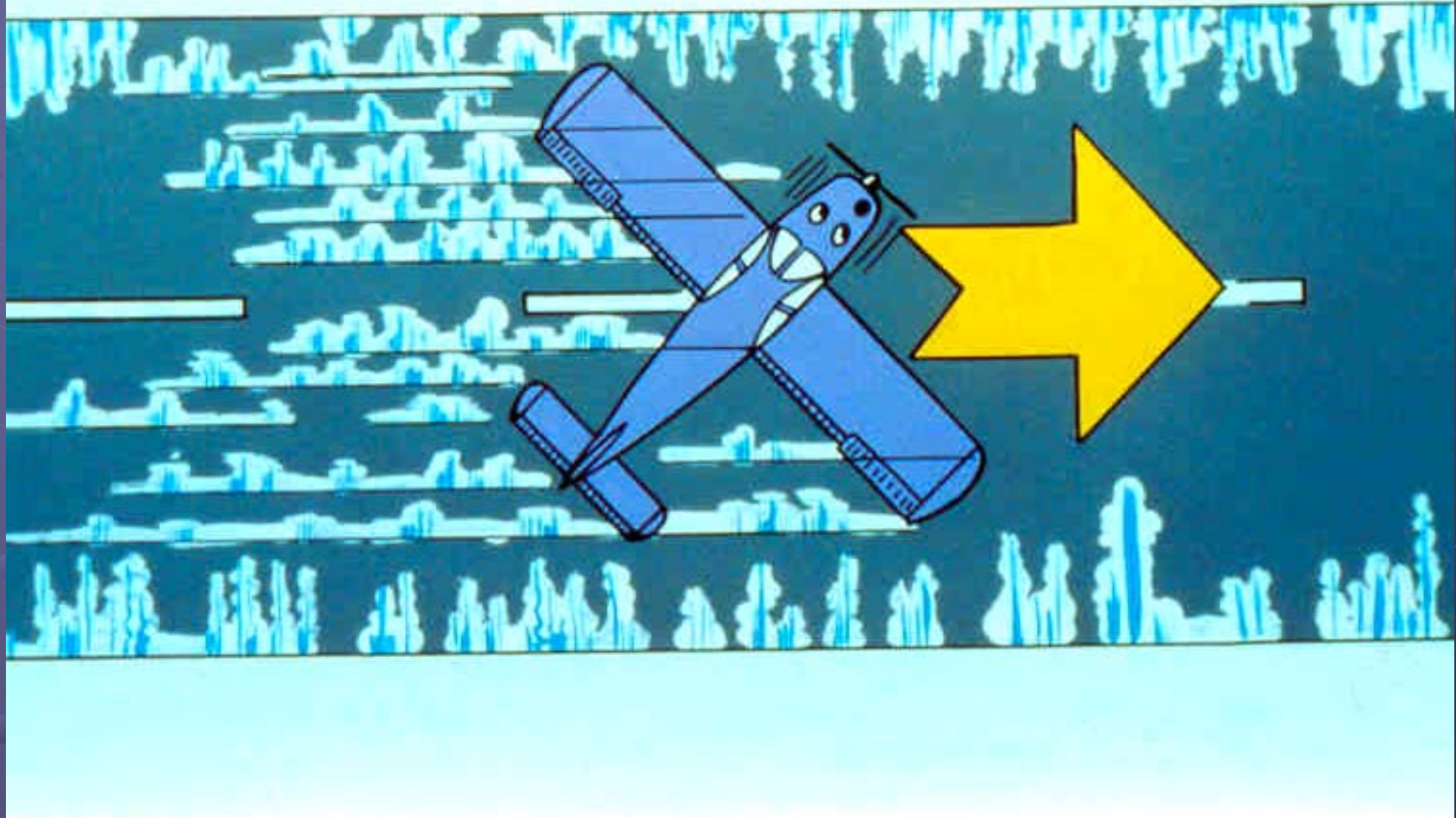




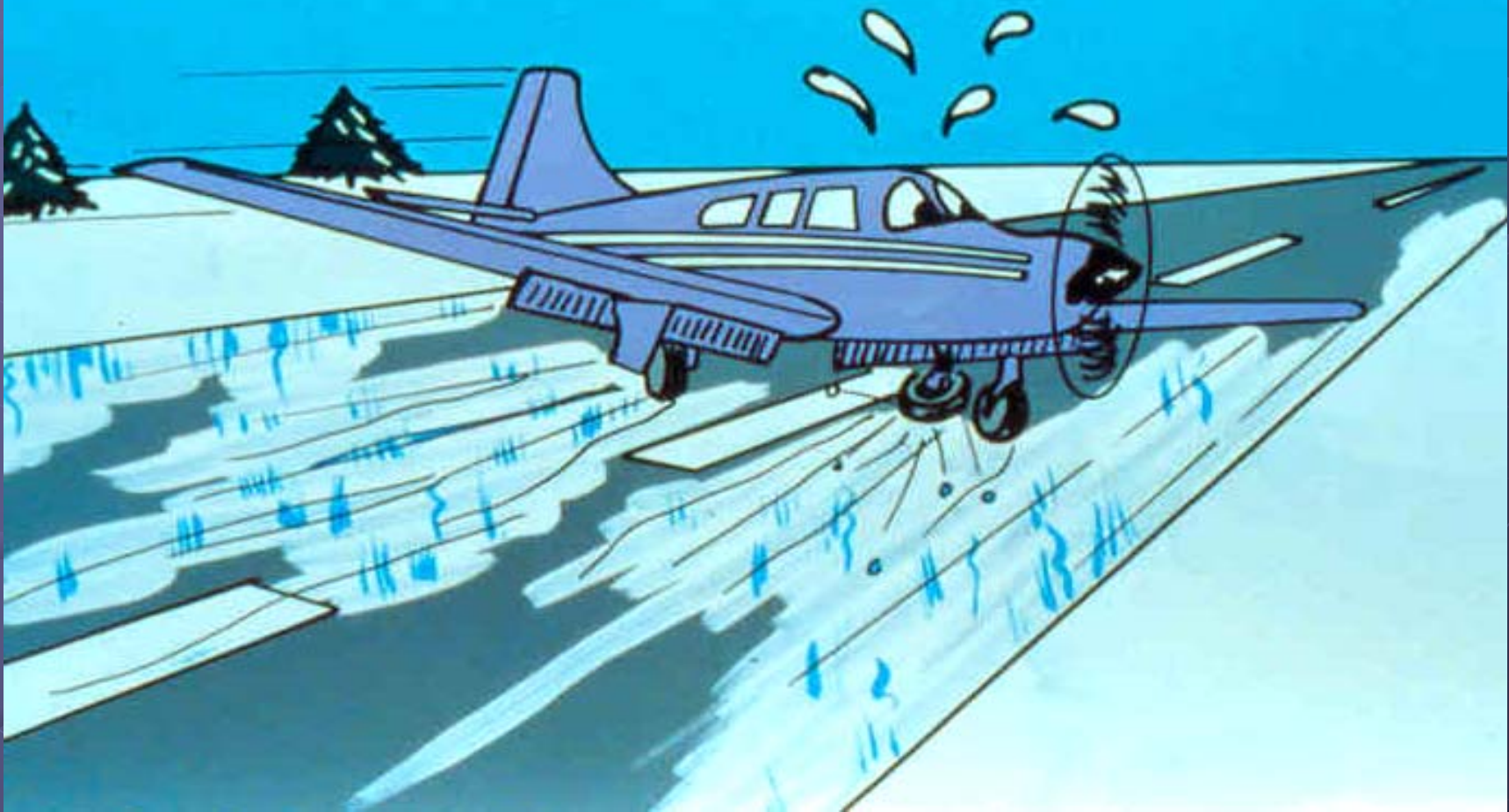




If there is ice, the amount of wind we can tolerate drops dramatically.



Side loads on landing gear



WINTER OPERATIONS





Snow Bank Hazard



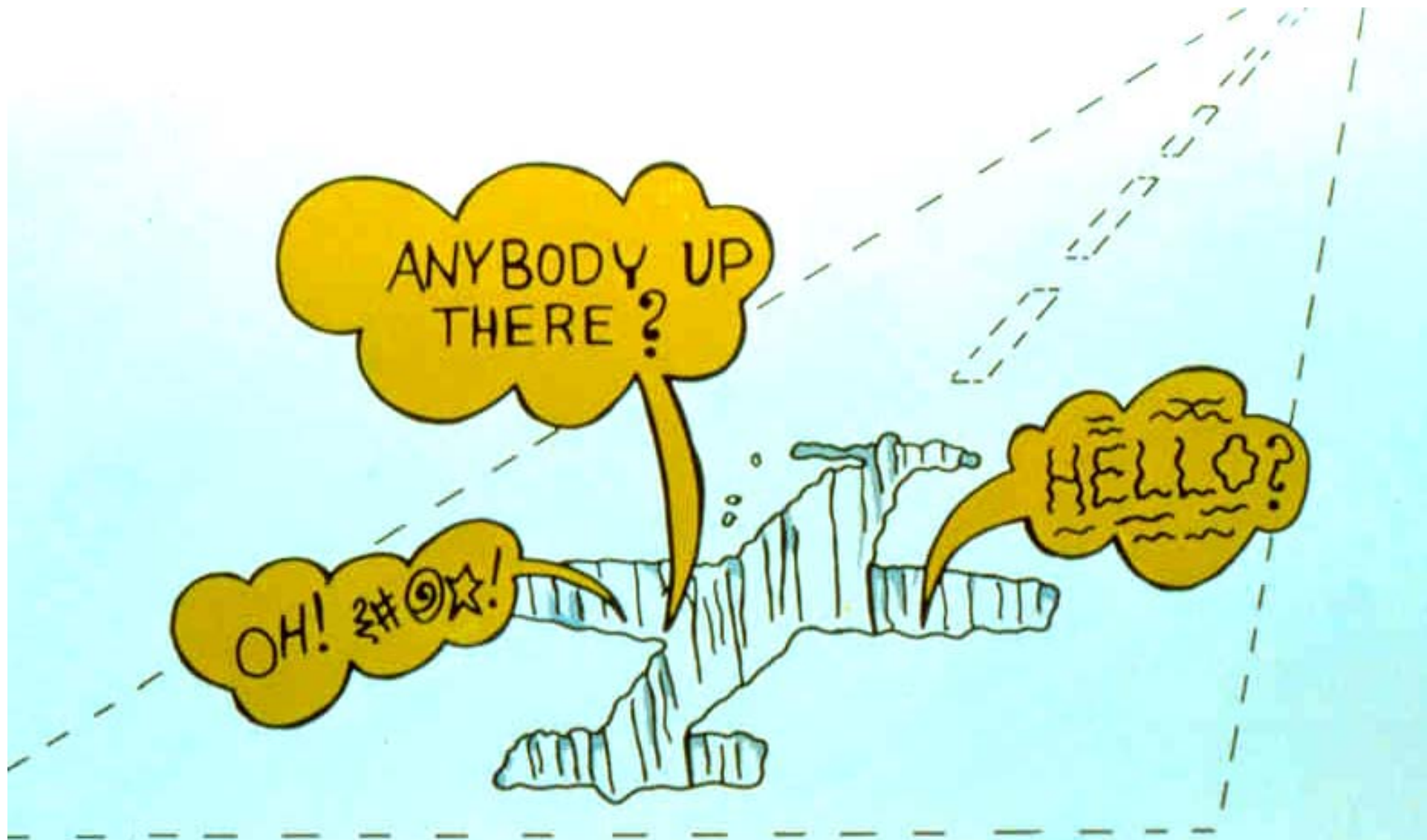
Snow depth ?

WINTER OPERATIONS



**...resulting in an abrupt stop that
may cause damage to the aircraft...**





or an airplane shaped hole in the snow.

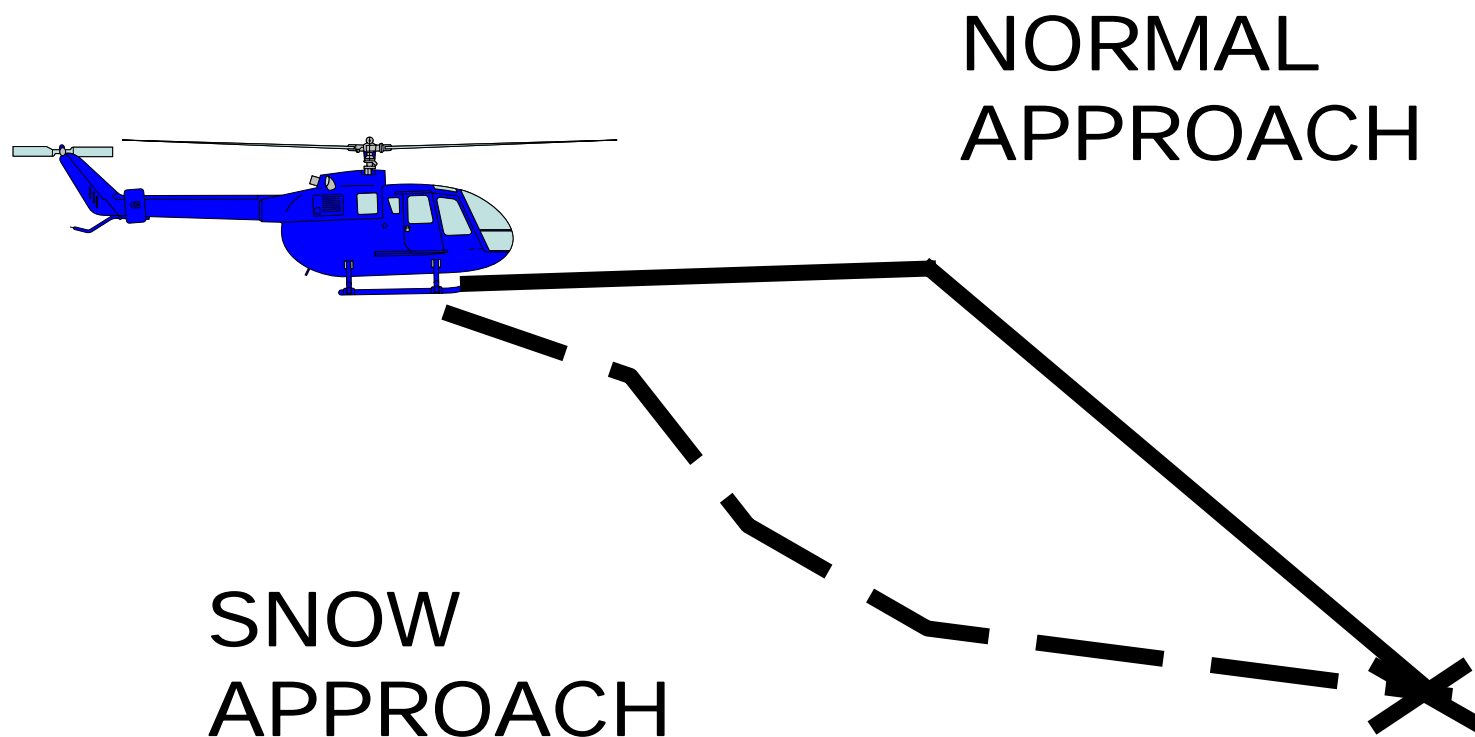
Braking Reports



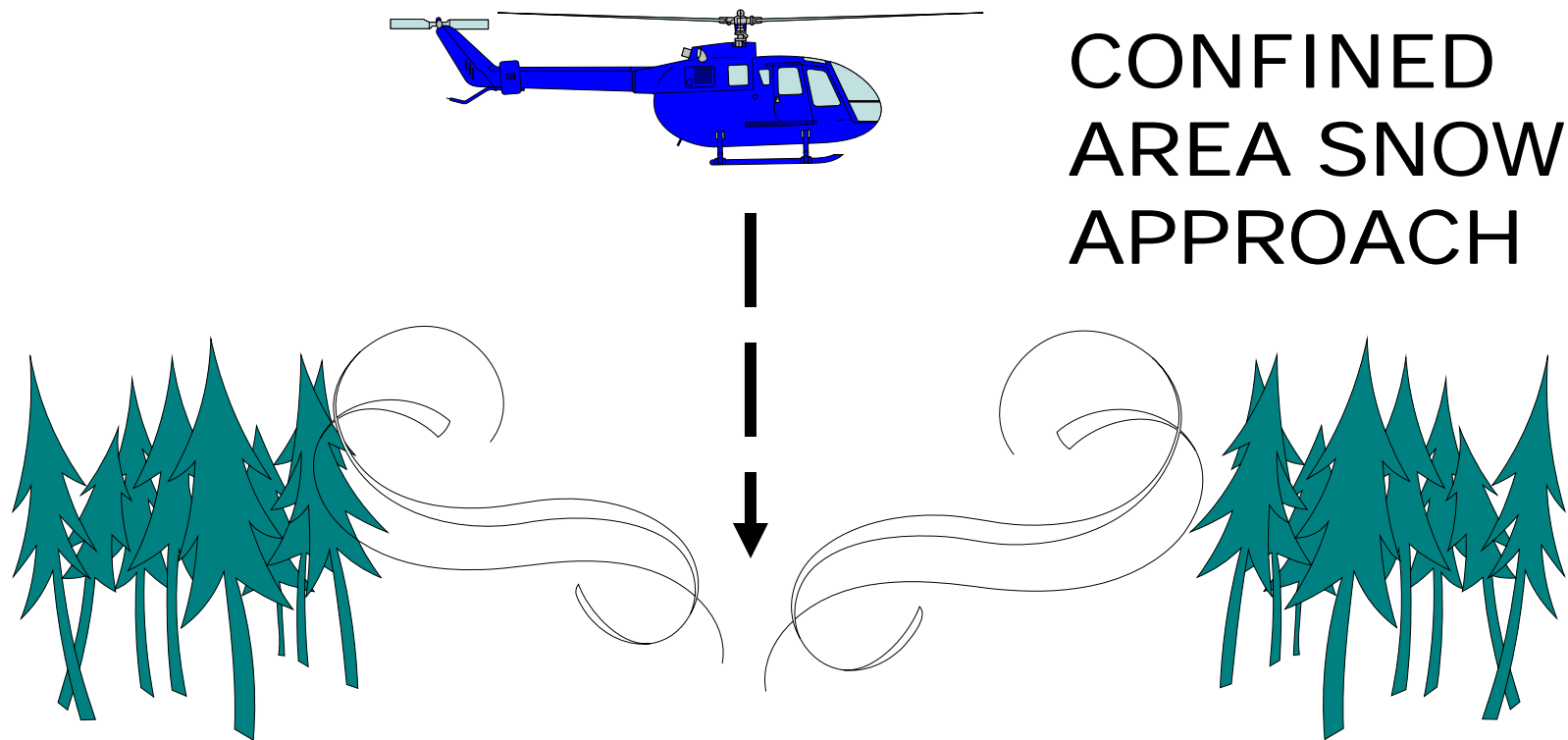
WINTER OPERATIONS



SNOW APPROACH



SNOW APPROACH





Landing on

Landing on Wet Runways

WINTER OPERATIONS



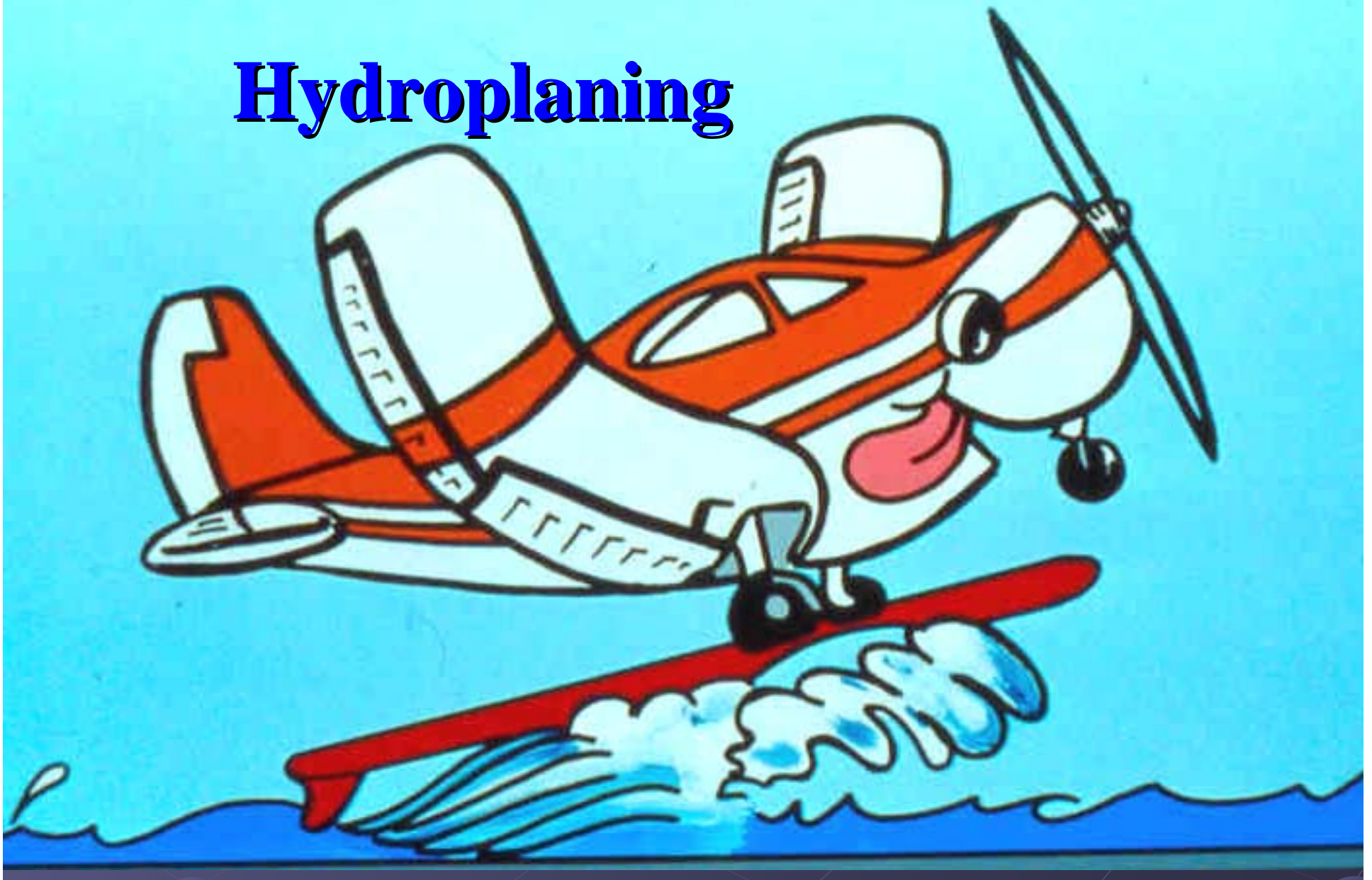




WINTER OPERATIONS



Hydroplaning



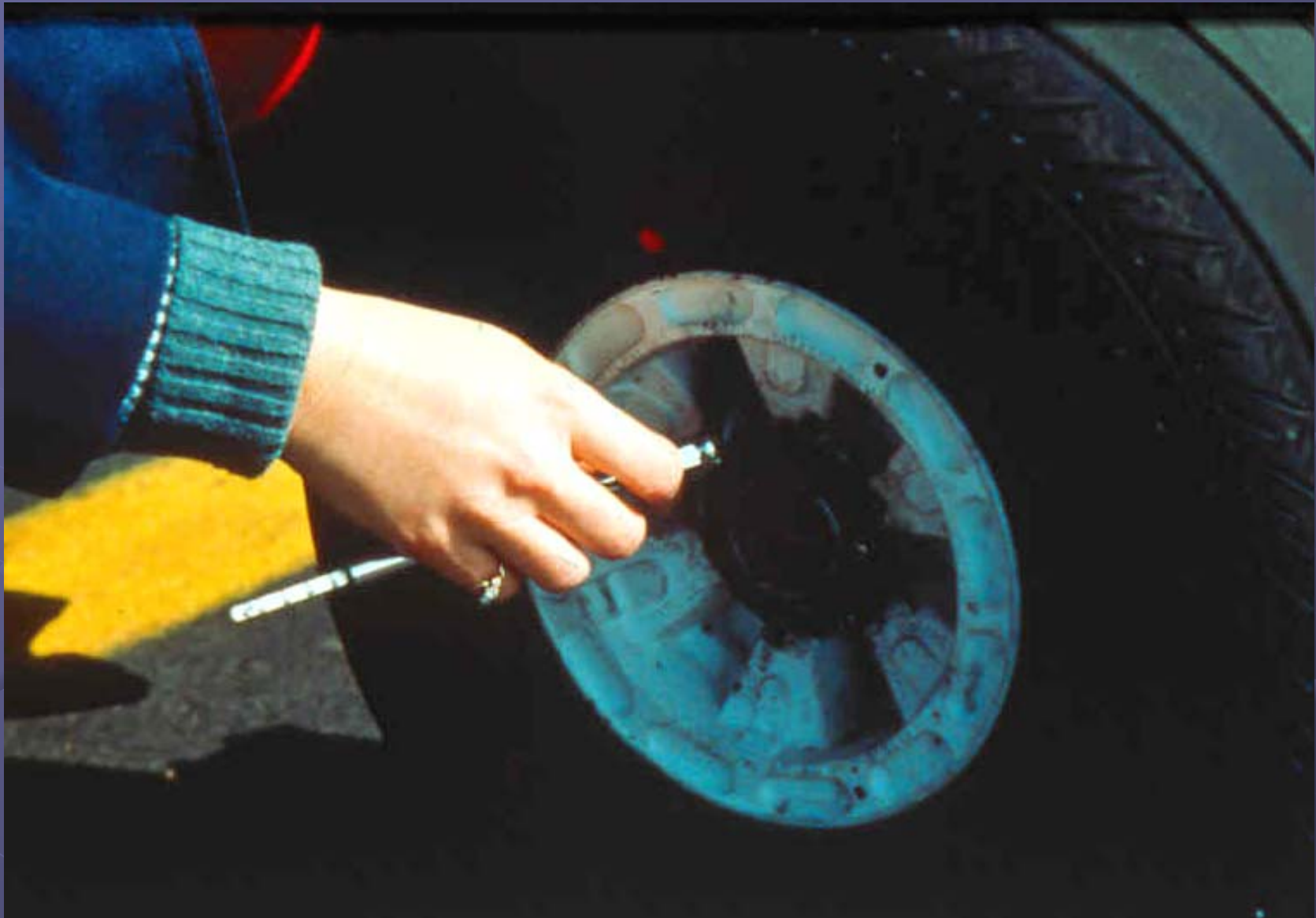
WINTER OPERATIONS



Grooved Runway

WINTER OPERATIONS





WINTER OPERATIONS



**MINIMUM DYNAMIC
HYDROPLANING SPEED
(ROUNDED OFF) EQUALS...**

$9 \times \sqrt{\text{TIRE PRESSURE (IN PSI)}}$

Landing on a wet runway

$$\sqrt{36} = 6$$

$$6 \times 9 = 54 \text{ KNOTS}$$

**SPEED
(KNOTS)**

54

50

0

**DYNAMIC
HYDROPLANING
COULD BEGIN ABOVE
THIS SPEED**

**NORMAL LANDING
SPEED**



WINTER OPERATIONS

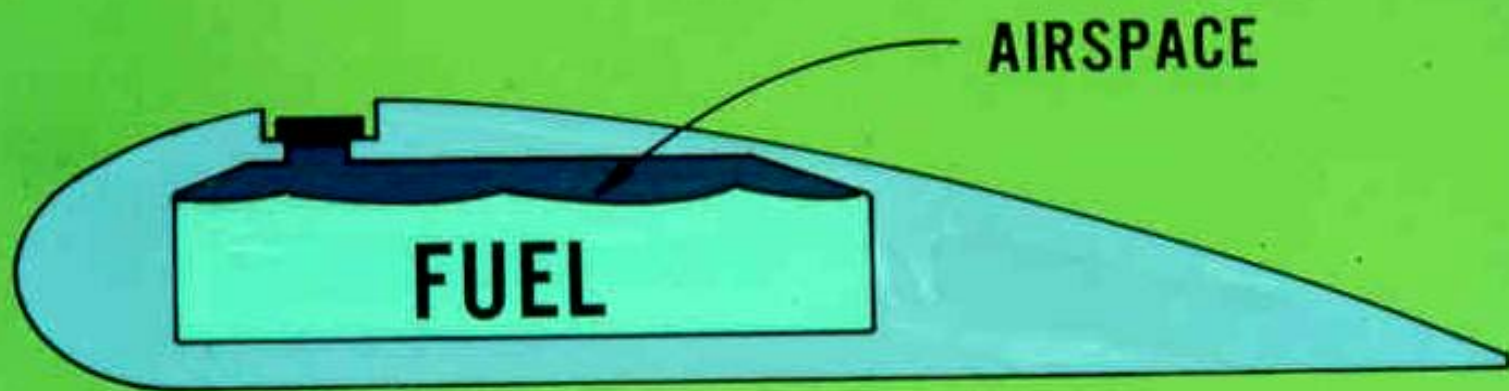




SERVICING

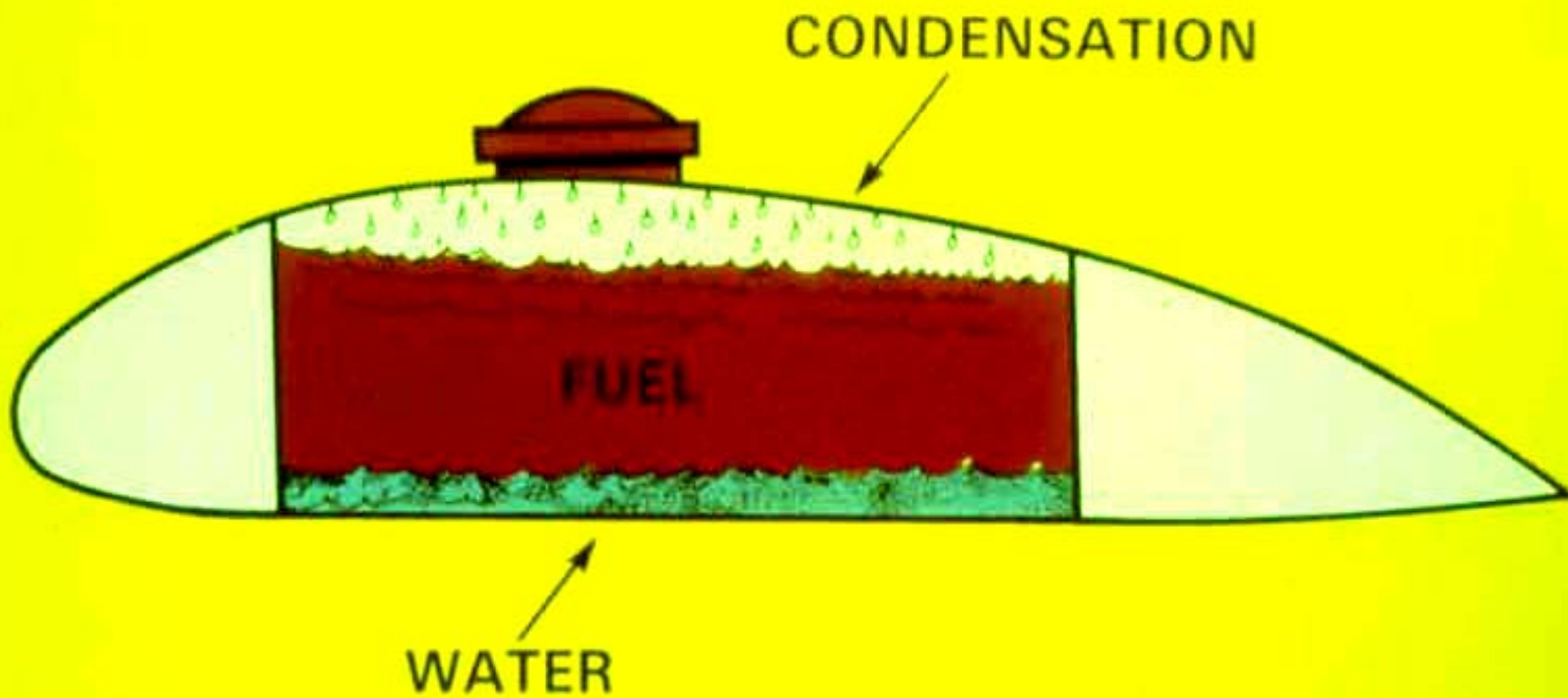
WINTER OPERATIONS





WINTER OPERATIONS





WINTER OPERATIONS



STATIC ELECTRICITY

WINTER OPERATIONS



STATIC ELECTRICITY

WINTER OPERATIONS



STATIC ELECTRICITY





WINTER OPERATIONS



STATIC ELECTRICITY




WINTER OPERATIONS





WINTER OPERATIONS



A twin-engine propeller aircraft is visible on a runway in the background, with a hazy, overcast sky and distant hills. The foreground shows a blurred view of the runway and a small blue object in the lower left corner.

**Winter operations require
greater vigilance and
pilot proficiency.**

“A Superior pilot is one
who uses Superior Judgment
to avoid situations
that require Superior skill.”



Federal Aviation Administration Safety Team (FAASTeam)

Thank You For Attending