CHAPTER - 3

CIRCUIT AND LANDING

Normal Circuit Procedure (Fig -1)

1. Oval Circuit pattern is to be practiced for all training Purposes.

2. In addition to the LINE-UP checks, the under mentioned procedures are to be following before and during take off:

a. On brakes, carry out the following:

(1) Check flaps set to 18^0
(2) Check heating System is off.
(3) NWS to Pedal Steering and Pedal Steering lt is on in CWD.
(4) PCL to fine pitch.
(5) Advance TCL to 85% n_G, pause for a while until all Engine indications have stabilized. Then advance smoothly to the full calculated takeoff power setting.

b. Release brakes and maintain direct con with the help of rudder pedal, con column forward and keep wings level by Co-Pilot/Pilot Flying (PF) and TCLs by Captain/Pilot Non Flying (PNF).

c. Keep the nose wheel on the ground until V_R is reached.
d. PNF will call out speed 50, 60, 70 kts and V_1, V_R.
e. Rotate the airplane to a take-off attitude of 5° and lift off the airplane.

3. After airborne maintain min 90 kts speed and att max 5° till gears up and take following action:

a. Brakes at a height 10-16 ft above runway.
b. Positive climb and Take-off speed+10 kts min, put gears up and check indicators by Pilot and co-Pilot.
b. Accelerate 115 kts or min obstacle clear speed and 400 ft or obstacle clear height, retract flaps. Check flaps indicator. Raise att to 10^0 on A/H.
c. TCL Set calculated max. Continuous power (80% Torque and PCL to 1900 rpm).
d. Carry out after take-off checks.
e. Height 600 ft or end of runway whichever comes later, carry out a cont climbing turn at a speed of 110-120 kts and AOB not more than 30°(15°-20°).
f. Level off at 1000 ft, set TCLs to cruise power settings. (TCL 42% torque and PCL to 1700 rpm).
g. Roll out on downwind with speed 135 kts.

4. Call DOWNWIND and carry out “APPROACH CHECKS”.

5. Abeam Threshold carry out following:

a. Check Hydraulic press and speed below 135 kts, lower gears.
b. Check 3 ‘Green’, check landing gear indicator.
c. Maintain speed 128 kts with gears, abeam threshold flaps down to $18^{0.}$

d. Carry out landing briefing.

6. Threshold app 4/8 '0' Clock (approx 25 sec ± wind effects from abm threshold), commence a cont descending turn to finals at AOB 17°-20°.

a. Set TCL to 30% torque depending on AUW.
b. Maintain speed 115-120 kts and ROD 200-300 ft/min.
c. Roll out on finals at 700 ft with speed below 105-110 kts.

7. On finals carry out the following:
a. Adjust TCL to 25% to maintain app speed 105-110 kts.
b. Carry out FINALs checks and call final.
c. Maintain app/glide path by ref to VASI/PAPI or runway threshold.
d. At a height of 50 ft (15 m) above runway, gradually reduce TCL to IDLE.

8. At the height of 10 ft (3 m) above runway gradually flare out; maintain wings level with the same power.

9. As aircraft sinks, give check to control ROD and touch down on the centre line.

10. Immediately after touch-down according to conditions:
a. Push-button of spoilers - PUSH AND HOLD.

11. After nose-wheel touch down

b. Brakes- APPLY
c. TCL- REVERSE RATING as required.

12. Dispersal as cleared by ATC.

NOTE:

1. Left Seated Pilot (Captain) will shift his left hand on NWS and bring the TCLs to Ground Idle by right hand.

2. Left Seated Pilot will bring the symmetric TCLs or all TCLs to reverse position observing the oil temp, cond and length of runway.

3. Apply gradual brakes to stop the aircraft.

Go-Around (Both Engine)

12. **Purpose**

a. Training.

b. If a landing can not be made due to :

(1) Error of judgment
or
(2) Instruction FROM ATC.

13. **Procedure**

Having decided to Go-round :

a. Give call.

b. Advance TCLs to T/ Off power settings.

c. Positive climb, gears up.

d. Retract flaps at 400f height and speed 115 kts.

e. Carry out after take off checks as of normal T/off.

Touch & Go (Both Engine)

14. **Purpose:**

a. Training

15. **Procedure**

a. Brief other crew about the intention at the end of the D/W.

b. After touch down when the main wheels are firmly on ground, set TCLs to required T/Off power setting.

c. Rotate nose at V_R speed and positive ROC gears up, height 400 ft speed 115 kts retract flaps.

Flapless App & Landing (Fig -2)

16. **Purpose** Flapless approach and landing is to be carried out on the following occasions:

a. Training.

b. In case of flap/Hydraulic sys emergency and fire in the wing.

c. In case of landing with prop wind milling.

17. **Procedure**

a. The procedure upto rolling out on finals is same as of normal app except lowering the flaps.

b. Attain and maintain the speed recommended, app speed 115-120 kts by last 45° of final turn.

c. On finals take reference from the AOA indicator.

d. Maintain app speed & adjust TCL.

e. Continue with normal app att till flare out.

Caution

a. AOA shall not be more than 8°

Note:

1. In case of full-stop landing- Bring the TCLs to 0° of upright during flare out.

2. Action after touch down remain same as of normal landing.

App with 18° Flaps

18. **Purpose**

a. Training.

b. Strong ‘x’ wind

c. In case of flap and hydraulic sys emergency.

19. **Procedure (Fig no-3)**

a. Continue as of normal circuit pattern till end of runway.

b. Initiate base turn with 17°-20° AOB.

c. At base maintain speed 115-120 kts and ROD 200 ft/min.

d. Attain and maintain the recommended app speed 105-110 kts by last 45° of the finals turn.

e. On finals height 700 ft, carry out Finals check.

f. Flare out at the beginning of the runway and bring TCLs to flight idle during the initiation of flare out.

g. Subsequent action are as of normal landings.

App with 42° Flaps (Fig-4)

20. **Purpose** Flap 42° app will be carried out for:

a. Training purposes.

b. If runway length is 5000 ft or less.

c. If air field elevation is 3000 m or more.

21. **Procedure**

a. Continue as of normal circuit pattern till base turn pt.

b. Initiate base turn with 17°-20° AOB.

c. At base maintain speed 110 kts.

d. On finals TCL 20%, speed >110 kts, flaps to 42°.

e. Open power to 30%, speed 95 kts.

f. Adjust app to initiate flare out at the beginning of the runway and maintain TCL to min 30%.

j. Bring TCLs to flight idle after completion of the flare out.

k. Subsequent action are as of normal landings.

Go-Around (Both Engine)

22. **Procedure** Having decided to go-round:

a. Confirm bleed closed & Auto retraction sw-on.

b. Give call.

c. Advance TCL to full power.

d. Flaps set to 18°.

e. +ve ROC -gears up

f. 400ft height, speed 115 kts retract flaps.

Touch & go

23. **Procedure.**

a. Brief crew at the end of D/W.

b. After main wheel firmly on the ground, gently nose wheel on the ground & set TCL to T/O power.

c. Set flaps to 18°.

d. Once VR SPEED then continue as of normal touch & go.

Bad Weather Circuit (Fig-5)

21. **Purpose** Bad Weather circuit is to be carried out:

    a. Training purposes.

    b. Circling app.

22. **Procedure**

    a. Upto upwind same as of Normal circuit.

    b. Level off at 500ft & speed 135 kts:

        (1) Level turn for ‘x’ wind

        (2) AOB 30°-40°

        (3) TCL 42%.

    c. Roll out Down wind & carry out D/W checks imm.

    d. At Base turning pt

    e. Level turns with AOB 30°-40°

    f. Speed-115-120 kts.

    g. Last 90° of Final turn

        (1) TCL 30%

        (2) ROD 200-300 ft/min

    h. Last 45° of final turn

        (1) Flaps - 18°/ Landing flaps

        (2) Speed – app speed 105-110 kts

        (3) ROD – 200-300 ft/min

    g. Finals:

        (1) Height 300 ft

        (2) Continue as of normal approach & landing

Note: Circuit is to be carried out at 500 ft height, clear of cloud keeping the runway in sight.

Short Circuit (Fig-6)

23. **Introduction** Short circuit demands a very high degree of accuracy and judgment on the part of aircrew. As such it should be practiced only during dual missions. In commitment it is prohibited to carry out such circuit at Tejgoan Air field due high obstructs around the air field.

24. **Purpose**

a. Training.

b. Carry out circling app in marginal weather conditions.

25. **Procedure**

a. Turn for D/W at 300 ft after take off at a speed of 110-130 kts, AOB 40°-45° with gears and flaps 18°down and TCL 50%-60%.

b. Level off at 500 ft and carry out the D/W checks after giving the D/W call.

c. Abm threshold commence final turn at app speed +5 kts.

d. 90°to finals, lower flaps to 42° & reduce speed to the recommended app speed 90-100.

e. Initiate descent to intercept the glide slope during last 45° of the final turn to roll out at 300±10 ft. Then onward continue as of normal app and landing.

26. **Purpose**

a. Training.
b. To land the aircraft in case of an Engine failure.

27. **Procedure**

a In case of an engine failure at or after V_1 take action as per check list.

b. Positive ROC raise gears, maintain V_2 speed till 400 ft or clear of obstacles. Then lower nose to accelerate to 119 kts.

c. Adjust live engine TCL to 80% depending on AUW. Continue climb to 1000 ft. Turn left/right to cross wind with AOB never crossing 20°.

d. Join down wind with 1000 ft height and adjust live engine TCL to 100%.

e. Carry out D/W checks & set TCL to 80% depending on AUW & temp & give call.

f. Turn base with AOB never crossing 20°, TCLs 30%, maintain speed app speed +10 for flaps 18° and ROD 600-700 fps.

g. Last 45° of turn, for flaps maintain speed 115-120 kts depending on AUW.

h. Roll out on finals with 700 ft height & correct app speed.

j. Intercept the G/S with flaps 18° at the correct (or slightly higher) app speed recommended.(110-115 kts)

k. Carry out asymmetric checks before reaching the VCH of 300 ft :

(1) Gears down-Three greens.

(2) Cleared to land -(By ATC)

(3) Approach and R/W clear.

(4) Good approach (speed & approach angle correct)

l. If the conditions are satisfied flaps can be lowered to 18° by 300 ft and make a normal app full stop landing. (approach speed 100-110 kts).

m. If any of the conditions is not satisfied initiate go round by 300 ft .

Landing with Cargo Door Open

28. **Purpose:**

a. Demonstration flight.

b. In case of emergency, if it is not possible to slide parachute door backward.

c. Training.

29. **Procedure:**

a. The circuit is same of normal circuit except on finals maintain rigidly approach speed 100-110 kts.

b. Initial flare out at a height of 20-10 ft descending gradually until touchdown.

NORMAL CIRCUIT PATTERN

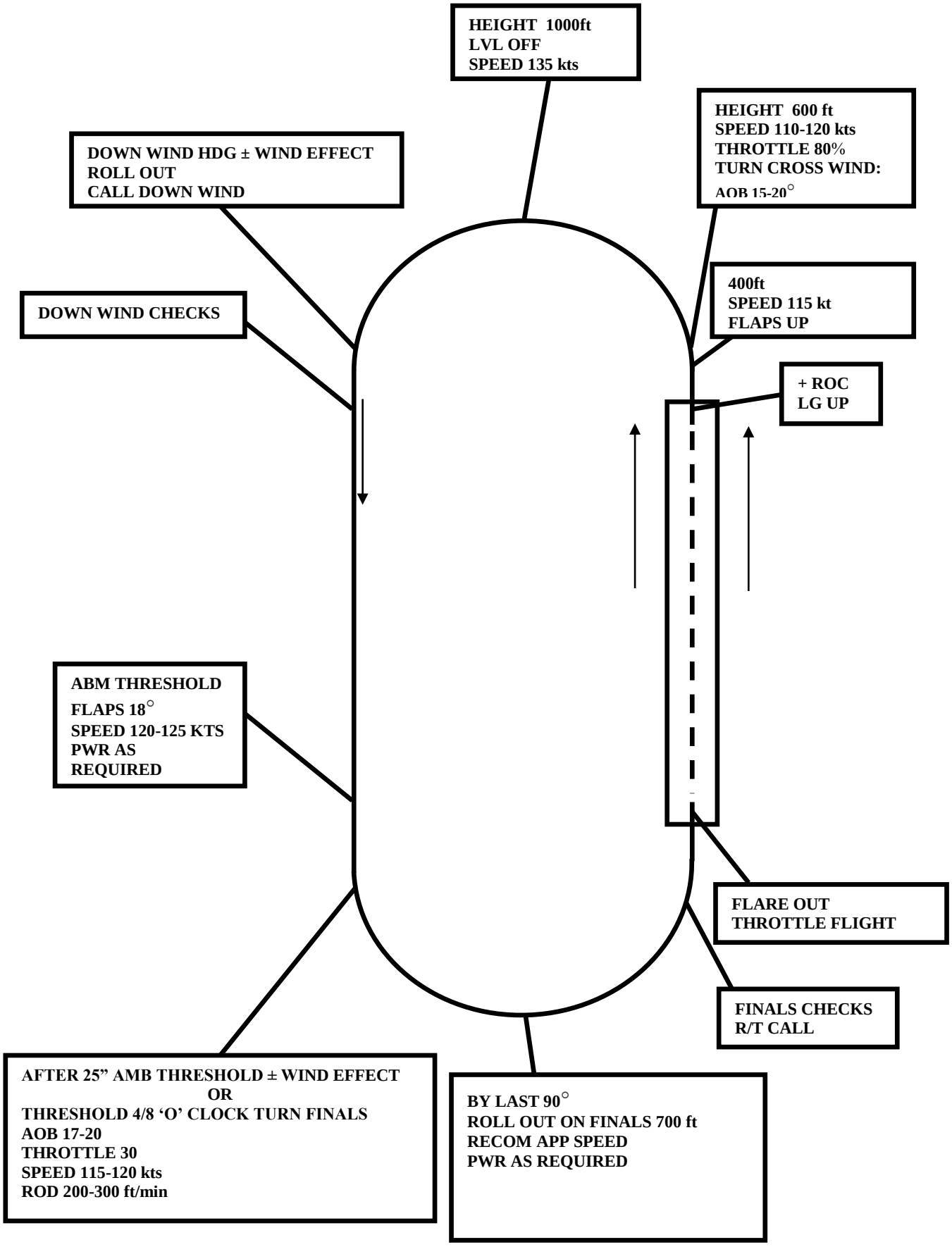

Fig: 1

CIRCUIT WITH FLAPS ZERO (0°)

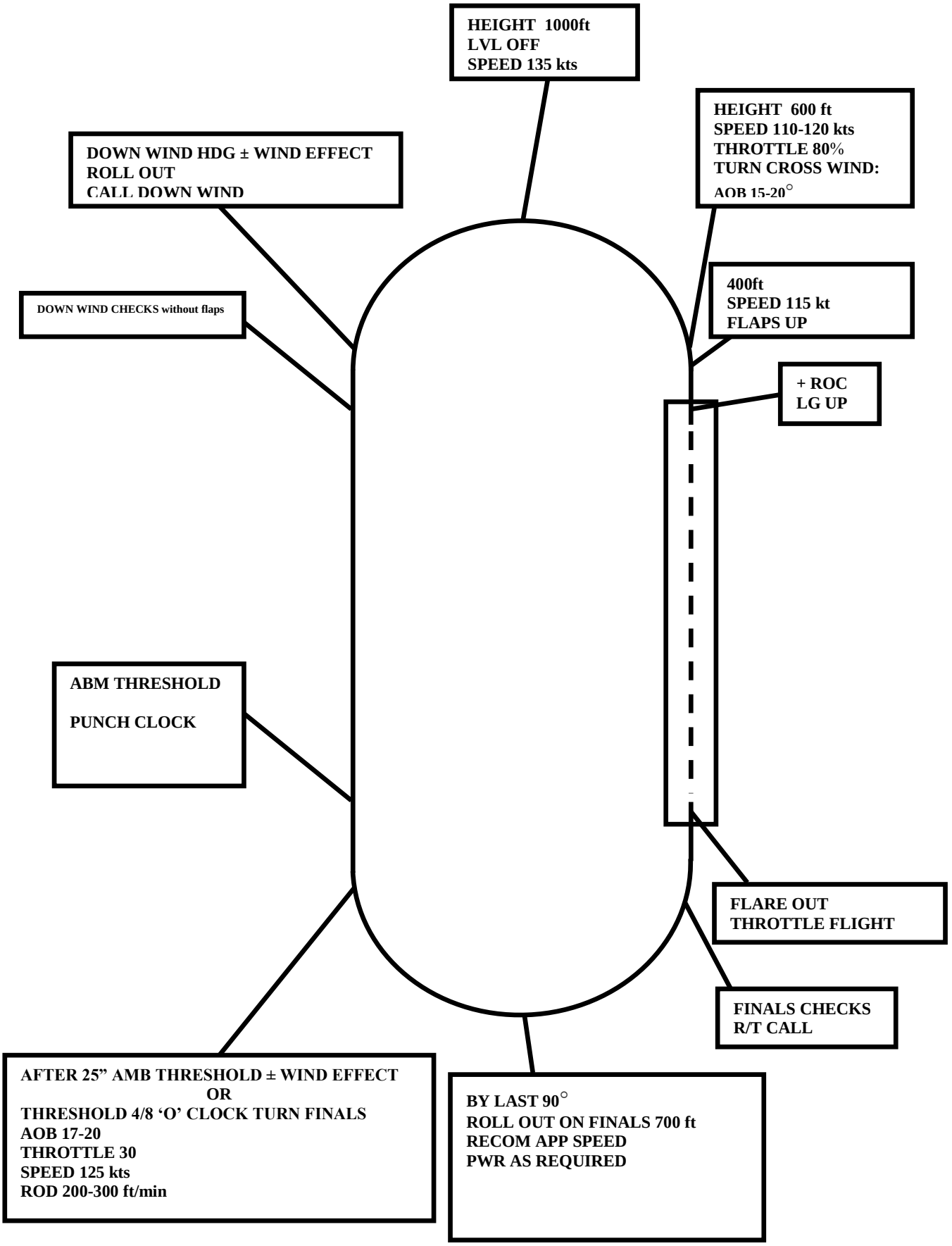

Fig: 2

CIRCUIT PATTERN WITH FLAPS 18°

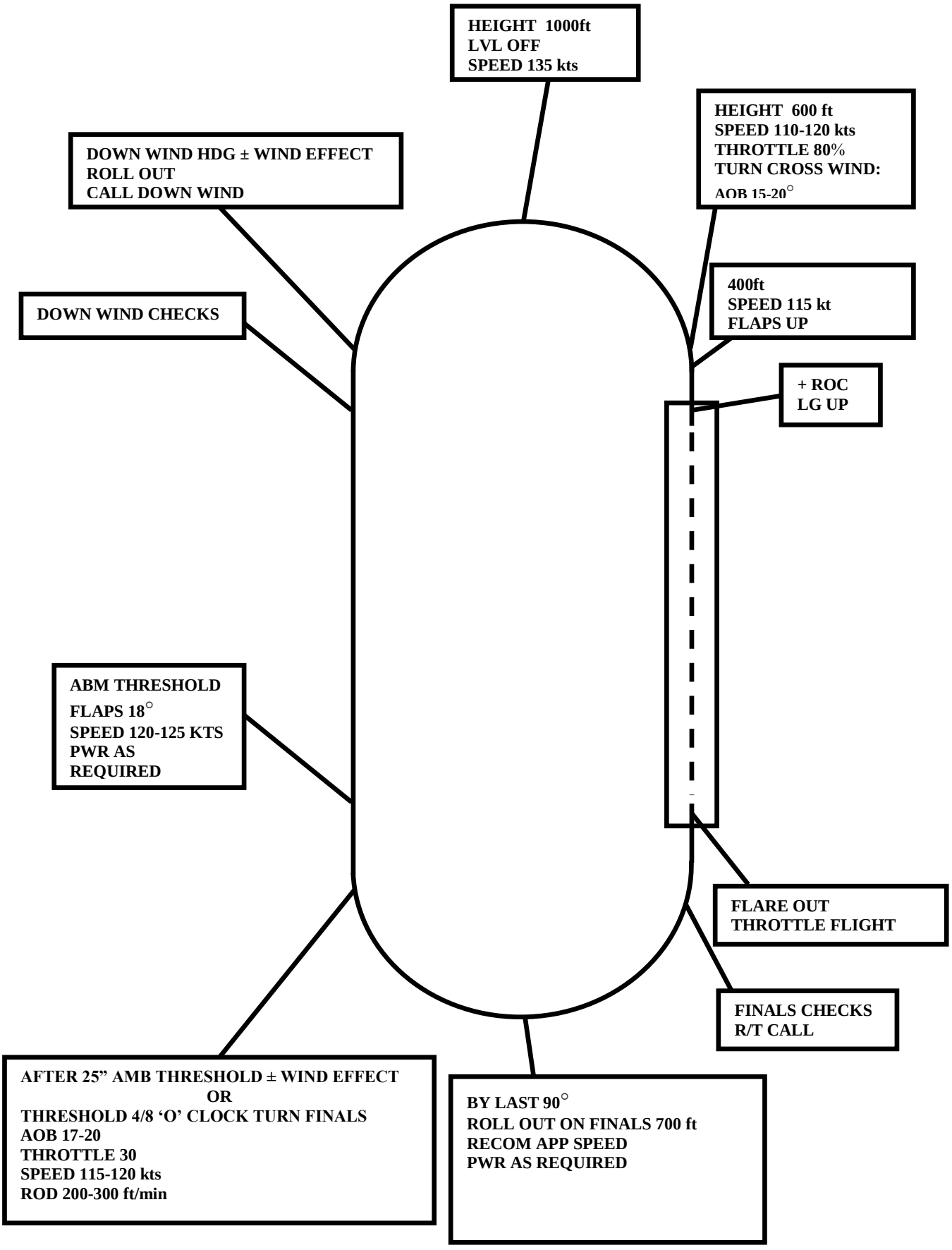

Fig: 3

CIRCUIT PATTERN WITH FLAPS 42°

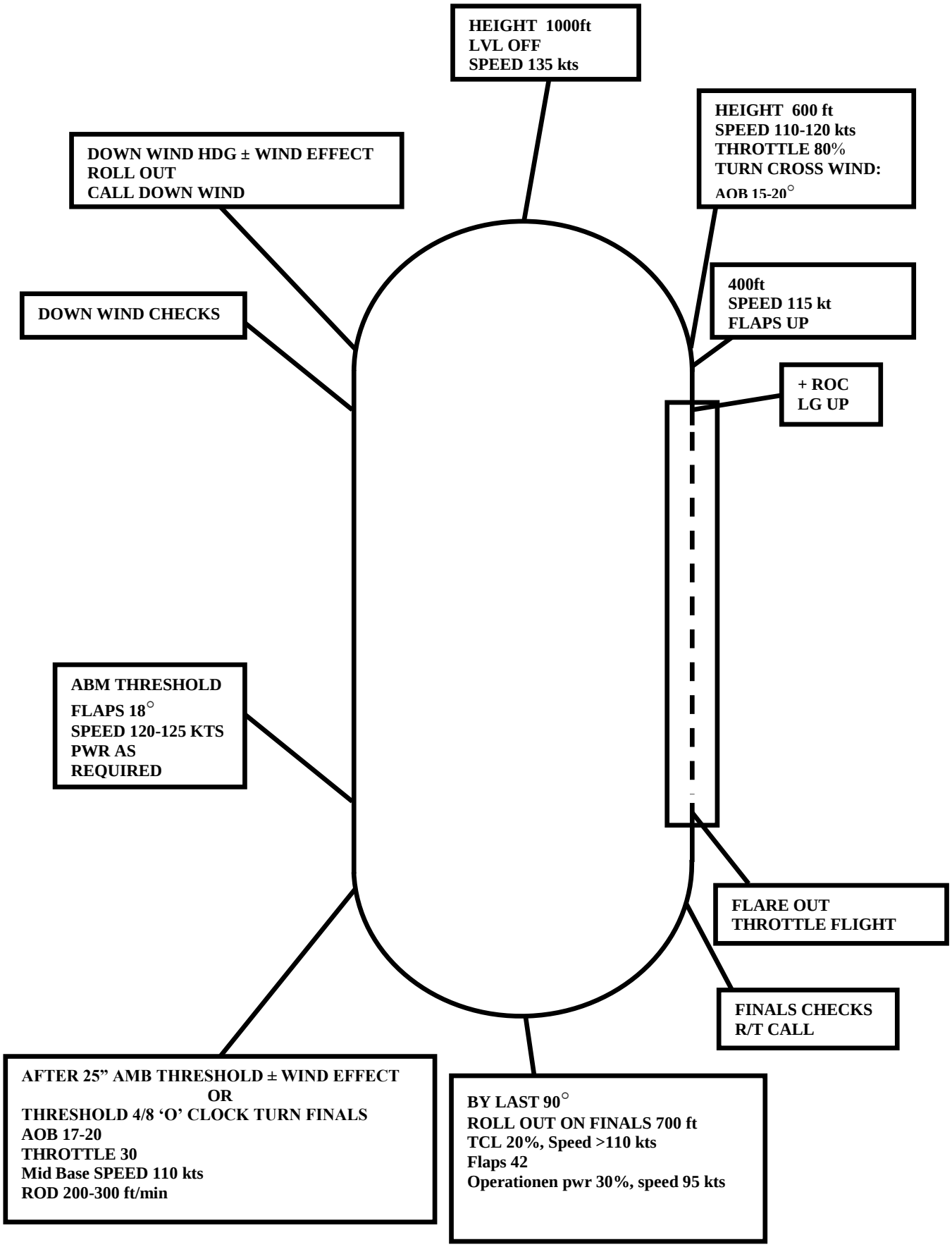

Fig: 4

BAD WEATHER CIRCUIT PATTERN

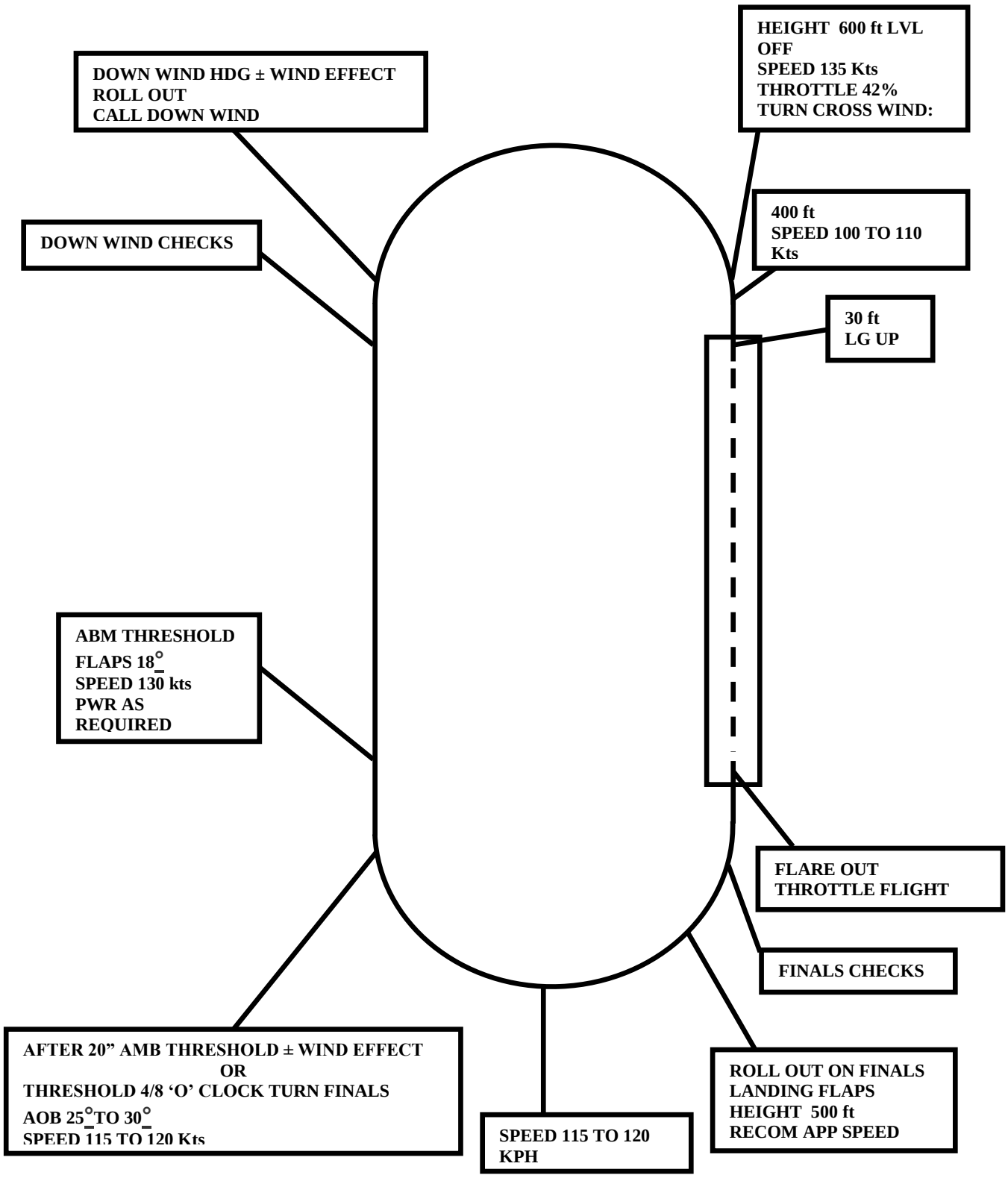

Fig: 5

SHORT CIRCUIT
(Except Tej R/W)

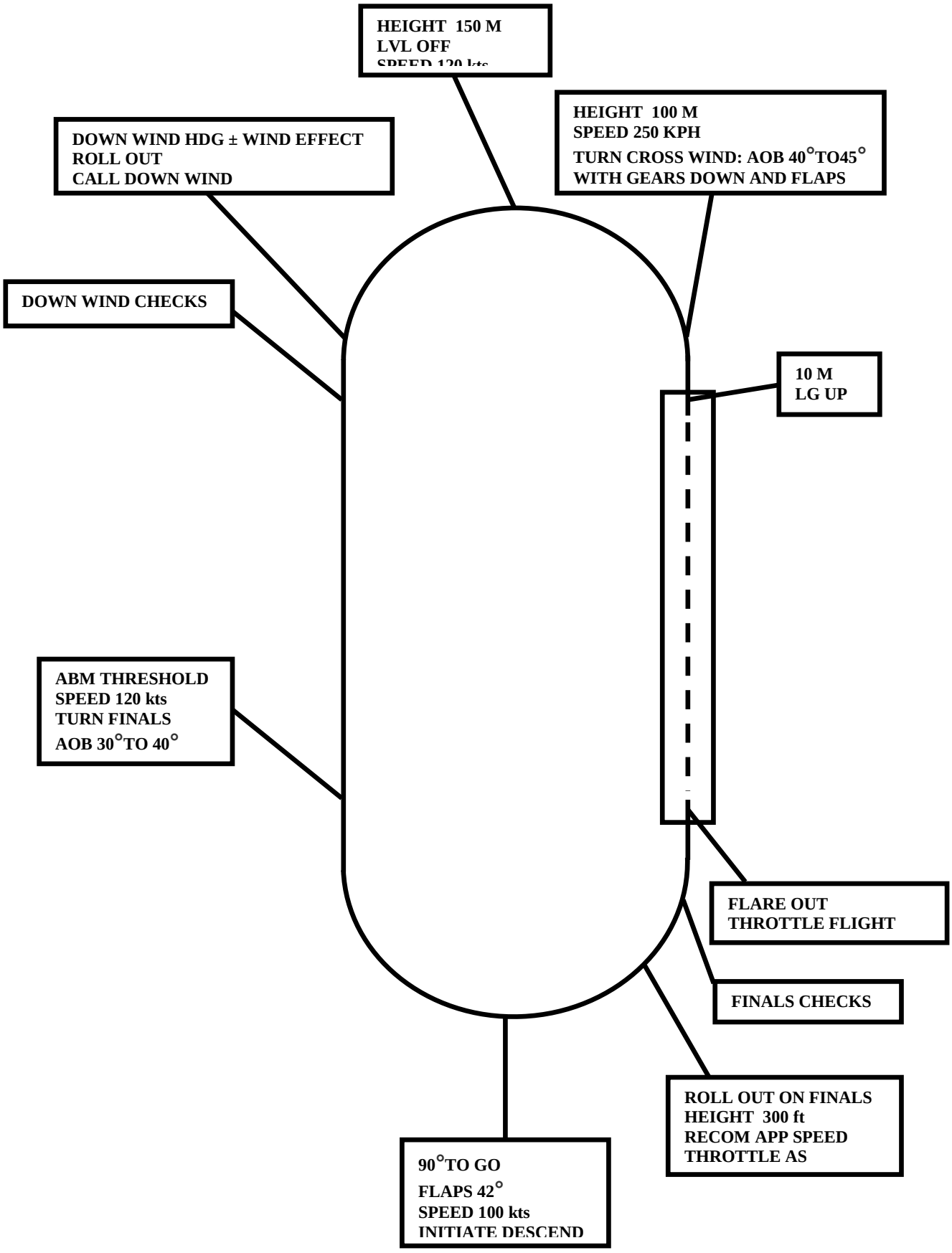

Fig: 6

SHORT FIELD T/O AND LANDING

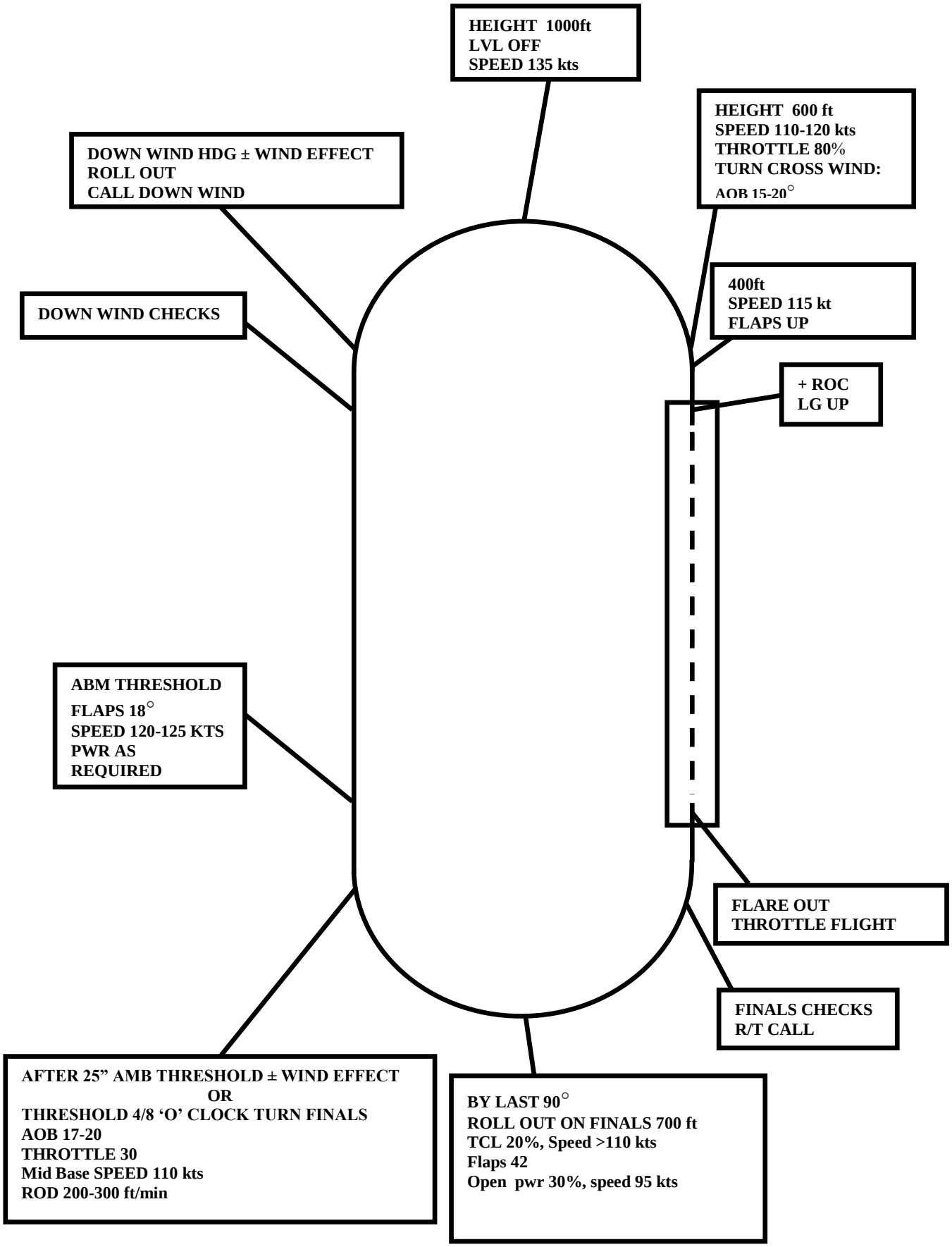

Fig: 7