Engine Failure After Takeoff in a Single-Engine Airplane

The Possible Turn

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July 2021

Disclaimer: These procedures should be practiced at a safe altitude and considered only when landing straight ahead is not a viable option. If you are uncomfortable performing this maneuver, obtain advice and training from a certified flight instructor. The turnaround maneuver described here is strictly an emergency procedure. It should not be utilized unless the pilot considers it more hazardous not to perform this maneuver.

DETERMINING MINIMUM TURNBACK ALTITUDE

To be accomplished at a safe altitude—NOT in the pattern

(for a given aircraft and configuration)

("height" = above ground; "altitude" = read on altimeter)

1. Establish aircraft in a stabilized climb halfway between V_X and V_Y on a cardinal heading.
2. Upon reaching a safe cardinal altitude, retard throttle.
3. Do nothing for 5 seconds and hold the nose up without stalling.
4. After these 5 seconds, simultaneously roll the aircraft into a 45^o-banked turn and pitch for no faster than best glide speed (or slightly slower).
5. Continue this maneuver until completing a 360-degree turn.
6. Roll out of the turn.
7. Perform a moderately aggressive flare to simulate a landing.
8. Note altitude when vertical speed becomes zero.
9. Subtract this altitude from the cardinal altitude at which the throttle was retarded.
10. The result is the altitude lost during a 360^O gliding turn. This is **observed altitude loss**.
11. Increase the altitude lost in a 360^O maneuver by 50% to arrive at the **turnback height**.
12. Add the **turnaround height** to airport elevation to determine the minimum **turnback altitude**.
13. Do not consider turning around unless 1) the aircraft has reached at least 2/3 of the **turnback height** when passing over the departure end of the runway, and 2) it has reached at least the minimum **turnback altitude**.

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ALTITUDE LOSS WORKSHEET

For Practice at a Safe Altitude

CARDINAL ALTITUDE …….		_____
Minus ALTITUDE AT END OF MANEUVER…….	-	_____
Equals OBSERVED ALTITUDE LOSS ..……	=	_____
Add 50% SAFETY MARGIN ...……..……	+	_____
Equals minimum TURNBACK HEIGHT ……	=	_____

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TAKEOFF PLANNING WORKSHEET

TURNBACK HEIGHT ……... _____

Multiply …… **x 2/3**

MINIMUM HEIGHT OVER END OF RUNWAY ... **=** _____

Add FIELD ELEVATION …….. **+** _____

MINIMUM ALTITUDE OVER END OF RUNWAY = ☐

(If below this altitude when crossing end of runway: DO NOT TURN BACK)

TURNBACK HEIGHT ……..…….. **=** _____

Add FIELD ELEVATION …… **+** _____

MINIMUM TURNBACK ALTITUDE …….. **=** ☐

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Turnback Flowchart

* Observed Altitude Loss = Altitude lost during a 360° test turnback maneuver

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