

# What is feathering?

February 21, 2023

**In news-** A preliminary report by the Aircraft Accident Investigation Commission of Nepal on the crash of a Yeti Airlines ATR 72-500 on January 15 in Pokhara says that the propellers of the plane were found in an unusual “feathered” position.

## What is feathering?

- During engine failure or an engine shutdown mid-air, a pilot flying an aircraft with variable-pitch propellers is able to change the pitch/ angle of the propeller blades so that they slice the airflow in a more or less parallel motion like a knife and not hit the air flatly.
- This has the effect of reducing the ‘drag’, increasing the gliding distance, and preventing airspeed from decaying below unsafe limits. This is called the **‘feathering’ of propellers.**
- In fact, **‘feathering’ is part of the checklist if the crew, faced with an emergency, of such aircraft is planning a forced landing.**
- **‘Windmilling’ propellers, unless ‘feathered’, can worsen an emergency during an engine failure at low heights.**
- However, if the aircraft is quite high, the ‘windmilling’ nature of propellers, rotated by the force of air, can in fact help restart a failed engine. There are specific checklists for this.

## Various types of propeller engines

- **Fixed-pitch propeller:** As the name suggests, the angle or pitch at which the propeller blades meet the airflow is fixed. The blade angle or pitch cannot be changed.
- **Adjustable-pitch propeller:** In this type, the propeller

pitch can be changed but only on the ground, physically – not while the aircraft is in flight.

- **Variable-pitch propeller:** Both the fixed-pitch and adjustable-pitch propeller types have their limitations. Pilots wanted different propeller pitches for takeoff, climb, cruise, etc. – a small blade pitch is ideal for takeoff, medium pitch for climb and high pitch for cruise. They also wanted propellers whose pitch could be changed from the cockpit during the flight.
- This was achieved by the variable-pitch propeller. As the name suggests, the propeller pitch could be changed by the pilot from the cockpit to suit flight conditions.
- **Constant-speed propeller:** This is a more advanced variable-pitch propeller, in which the blade pitch changes automatically to maintain a constant aircraft speed.

### **What happens when the propellers stop functioning?**

- During engine failure or an in-flight engine shutdown, the affected engine no longer produces 'thrust' , the power that propels the aircraft forward. The pilot faces another problem as well.
- The air hitting the giant 'windmilling' propeller blades produces enormous 'drag' – a force that acts in the opposite direction of 'thrust'.
- With no or reduced 'thrust' as a result of the engine malfunctioning or having shut down, and enormous 'drag', the glide performance and airspeed of the plane can be severely impaired.