

Turning

20151220

Aim

To learn how to conduct various types of turn, and to turn accurately towards a features and on to specific headings

Objectives

From memory correctly state:

- Using the model, correctly state the force that turns the aircraft.
- From memory, correctly state the effect on turning performance when IAS is increased.
- From memory, correctly state the technique to enter, maintain, and exit a medium level turn.

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- VCL ~ Vertical Component of Lift
 - HCL ~ Horizontal Component of Lift
 - Turn is caused by HCL
 - Load Factor (LF) = Lift:Weight
 - Straight & Level, 1:1
 - 30deg, 1.15:1
 - 60deg, 2:1

Turn Performance

- AoB ~ Angle of Bank
- With constant IAS and increasing AoB
 - Turn Radius decreases
 - Rate of Turn increases
- With increasing IAS and constant AoB

- Turn Radius increases
- Rate of Turn decreases

Adverse Aileron Yaw

- Adverse Aileron Yaw is tendency to yaw out of turn
- Frise Aileron to counteract
- Differential Aileron to counteract

Slip and Skid

- For example, under a left turn
 - Inclinator to the left



Slip: needs left rudder input

- Inclinator to the right



Skid: needs right rudder input

- Inclinator centre



Balanced

Over/Under banking

- Climbing Turn
 - Outer wing
 - * Greater AoA on outer wing
 - * Overbank tendency

- * Aileron to correct
- Descending Turn
 - Inner wing
 - * Greater AoA on inner wing
 - * Underbank tendency
 - * Aileron to correct

Types of Turn

- **Gentle:** Up to 15 degrees AoB
- **Rate 1:** $(\text{True Air Speed} + 7) / 10$, usually ~15 degrees AoB, also known as 2 minute turn
- **Medium:** 30 degrees AoB
- **Climbing:** 15 degrees (Rate 1) limit
- **Descending:** 30 degrees (Medium) limit

Application

1. Lookout
2. Select reference
3. Select Altitude
4. Begin turn: ALAP
5.
 - Bank with aileron
 - Balance with rudder for slip & skid (slight)
 - Backpressure on elevator (slight)
6. End turn: ALAP

Airmanship

Handing over and taking over clarity.

Threat & Error Management

- Aeroplane
 - Threat: high wing in C162 obscures vision, manage with lookout
- Pilot
 - Threat: disorientation, manage with handover
- Environment
 - Threat: terrain, manage with lookout