Questions

Straight and Level *(20151214)*

- **What is the work flow for changing cruise?**

  Power, Attitude, Speed, Trim (PAST)

- **What is the work flow for maintaining cruise?**

  Attitude, Lookout, Attitude, Performance (ALAP)

- **What are the four forces at straight and level?**

  Lift, Weight, Thrust, Drag

- **What is the effect of the four forces at straight and level?**

  They all equal zero.

- **Under straight and level, AoA increases. What other effect occurs?**

  IAS decreases

- **Under straight and level, IAS increases. What other effect occurs?**

  AoA decreases

- **Under straight and level, AoA decreases. What other effect occurs?**

  IAS increases

- **Under straight and level, IAS decreases. What other effect occurs?**

  AoA increases

- **What are the two types of drag?**

  Induced, Parasitic

- **What are the three types of parasite drag?**

  Form, Skin Friction, Interference

- **Which of the two types of drag is most pronounced?**

  Induced drag

- **What are the effects of induced drag and parasite drag?**

Induced drag causes nose-down attitude. Parasite drag causes nose-up attitude to a lesser effect. The horizontal stabiliser causes a nose-up pitch to account for the difference.

- **What are the three types of stability?**

  Positive, Neutral, Negative

- **What is the type and axis of stability of the longitudinal axis of roll?**

  Positive stability on pitch

- **What is the type and axis of stability of the lateral axis of pitch?**

  Neutral stability on roll

- **What is the axis of stability of the directional axis?**

  Yaw

- **What is the application of normal cruise?**

  Power at 2300rpm, “5 fingers” attitude, gives performance of 100KIAS

- **What is the application of fast cruise?**

  Power at 2500rpm, “6 fingers” attitude, gives performance of 110KIAS

- **What is the application of slow cruise?**

  Power at 2100rpm, “4 fingers” attitude, gives performance of 80KIAS

- **What is the application of slow cruise with flaps?**

  Power at 2100rpm, “5 fingers” attitude, gives performance of 70KIAS

- **What is the lift equation?**

  lift equals the coefficient of lift multiplied 0.5 rho multiplied velocity squared mutiplied wing area.

  lift equals lift coefficient multipled 0.5 multipled air density multipled velocity squared multipled wing area.

  `L = Cl * .5 * r * V^2 * A`

Climbing and Descending *(20151218)*

Climbing

- **What is VCW?**

  The Vertical Component of Weight.

- **What is RCW?**

  The Rearward Component of Weight.

- **What is the definition of a climb?**

  An increase in altitude at constant airspeed.

- **In a climb, what components make up thrust?**

  Drag + RCW.

- **What is Vx?**

  Best angle of climb.

- **How is Vx calculated?**

  Vx is the greatest difference between Thrust Available (TA) and Thrust Required (TR) on a thrust versus speed graph.

- **What is Vy?**

  Best rate of climb.

- **How is Vy calculated?**

  Vy is the greatest difference between Power Available (PA) and Power Required (PR) on a power versus speed graph.

- **If weight is decreased, what happens to best angle of climb?**

  increase

- **If weight is decreased, what happens to best rate of climb?**

  increase

- **If flaps are extended, what happens to best angle of climb?**

  decrease

- **If flaps are extended, what happens to best rate of climb?**

  decrease

- **If head wind, what happens to best angle of climb?**

  increase

- **If head wind, what happens to best rate of climb?**

  unaffected

- **If altitude increases, what happens to best angle of climb?**

  decrease

- **If altitude increases, what happens to best rate of climb?**

  decrease

- **What is the power setting to achieve best angle of climb?**

  Full throttle

- **What is the power setting to achieve best rate of climb?**

  Full throttle

- **What is the power setting to achieve cruise climb?**

  Full throttle

- **What is the attitude setting to achieve best angle of climb?**

  “high”, screen at horizon”

- **What is the attitude setting to achieve best rate of climb?**

  “medium”, lower than Vx”

- **What is the attitude setting to achieve cruise climb?**

  “low”, lower than Vy”

- **What is the performance setting to achieve best angle of climb?**

  57KIAS

- **What is the performance setting to achieve best rate of climb?**

62KIAS

- **What is the performance setting to achieve cruise climb?**

  75-85KIAS

- **What is the rudder input to achieve best angle of climb?**

  strong

- **What is the rudder input to achieve best rate of climb?**

  medium (< Vx)

- **What is the rudder input to achieve cruise climb?**

  low (< Vy)

- **What is the work flow for a climb?**

  - Entry: Power, Attitude Speed, Trim
  - Maintain: Attitude, Lookout, Attitude, Performance
  - Exit: Attitude, Speed, Power, Trim

- **What airmanship components are considered for climbing?**

  - 500ft check lookout.
  - maintain balance with rudder using ball indicator.
  - non-abrupt power changes.

- **What threats and management from the aircraft exist during a climb?**

  Nose-up attitude obstructs view, managed with 500ft check.

- **What threats and management from the pilot exist during a climb?**

  Illness e.g. sinus infection, managed with No Fly.

- **What threats and management from the environment exist during a climb?**

  Climb into Sun obstructs view, managed by not climbing into the Sun.

Descending

- **What is FCW?**

  The Forward Component of Weight.

- **If weight is decreased, what happens to best angle of descent?**

  unaffected.
- **If weight is decreased, what happens to best rate of descent?**

  decrease.
- **If flaps are extended, what happens to best angle of descent?**

  increase.
- **If flaps are extended, what happens to best rate of descent?**

  increase.
- **If head wind, what happens to best angle of descent?**

  increase.
- **If head wind, what happens to best rate of descent?**

  neutral.
- **What is the power setting for a glide descent?**

  Idle.
- **What is the attitude for a glide descent?**

  Straight & level.
- **What is the performance setting for a glide descent?**

  70KIAS.
- **What is the power setting for a cruise descent?**

  2000rpm.
- **What is the attitude for a cruise descent?**

  1 degree down from straight & level.
- **What is the performance setting for a cruise descent?**

  90KIAS, 500FPM.
- **What is the power setting for an approach descent?**

  1500-1700rpm.
- **What is the attitude for an approach descent?**

  “half sky/half ground” view.

- **What is the performance setting for an approach descent?**

  75KIAS, 500FPM.

- **What is the work flow for a descent?**

  Begin: Power, Attitude, Trim

  Maintain: Attitude, Lookout, Attitude, Performance

  Exit: Power, Attitude, Trim

- **What airmanship components are considered for descending?**

  - Airspace; maximum 3500ft due to YBBN traffic.
  - Airspace; the YBAF steps for approach.
  - Carburetor heat

- **What threats and management from the aircraft exist during a descent?**

  Spark plug fouling, managed by warming the engine.

- **What threats and management from the pilot exist during a descent?**

  Illness, managed with No Fly.

- **What threats and management from the environment exist during a descent?**

  Clouds, managed with lookout and no descent into clouds.

Climbing

- **Climb the aircraft at best angle**
  - Begin climb
    - Rudder high
    - **P**ower at full throttle
    - **A**ttitude top of screen to horizon
    - **S**peed at 57KIAS
    - **T**rim
  - Maintain climb
    - **A**ttitude

        * **L**ookout 500ft check
        * **A**ttitude
        * **P**erformance
    - Exit climb
        * **A**ttitude
        * **S**peed
        * **P**ower
        * **T**rim
- **Climb the aircraft at best rate**
    - Begin climb
        * Rudder medium
        * **P**ower at full throttle
        * **A**ttitude dashboard coaming to horizon
        * **S**peed at 62KIAS
        * **T**rim
    - Maintain climb
        * **A**ttitude
        * **L**ookout 500ft check
        * **A**ttitude
        * **P**erformance
    - Exit climb
        * **A**ttitude
        * **S**peed
        * **P**ower
        * **T**rim
- **Climb the aircraft at cruise**
    - Begin climb
        * Rudder low
        * **P**ower at full throttle
        * **A**ttitude nose to horizon
        * **S**peed at 75-85KIAS

        * **T**rim
    - Maintain climb
        * **A**ttitude
        * **L**ookout 500ft check
        * **A**ttitude
        * **P**erformance
    - Exit climb
        * **A**ttitude
        * **S**peed
        * **P**ower
        * **T**rim

Descending

- **Descend the aircraft at glide**
    - Begin descent
        * **P**ower to idle
        * **A**ttitude to straight and level
        * **T**rim
    - Maintain descent
        * **A**ttitude
        * **L**ookout 500ft check
        * **A**ttitude
        * **P**erformance at 70KIAS
    - Exit descent
        * **P**ower
        * **A**ttitude
        * **T**rim
- **Descend the aircraft at cruise**
    - Begin descent
        * **P**ower to 2000rpm

        - **A**ttitude to 1 degree down from straight and level
        - **T**rim
    - Maintain descent
        - **A**ttitude
        - **L**ookout 500ft check
        - **A**ttitude
        - **P**erformance at 90KIAS, 500FPM
    - Exit descent
        - **P**ower
        - **A**ttitude
        - **T**rim
- **Descend the aircraft at approach**
    - Begin descent
        - **P**ower to 1500-1700rpm
        - **A**ttitude to half sky/half ground
        - **T**rim
    - Maintain descent
        - **A**ttitude
        - **L**ookout 500ft check
        - **A**ttitude
        - **P**erformance at 75KIAS, 500FPM
    - Exit descent
        - **P**ower
        - **A**ttitude
        - **T**rim

Turning *(20151220)*

- **Which force turns an aircraft?**

The horizontal component of lift (HCL).

- **What makes up a Load Factor?**

  The ratio of lift to weight.

- **Given a constant IAS and increasing AoB, what happens to Turn Radius and Rate of Turn?**

  Turn Radius decreases, Rate of Turn increases

- **Given an increasing IAS and constant AoB, what happens to Turn Radius and Rate of Turn?**

  Turn Radius increases, Rate of Turn decreases

- **What is adverse aileron yaw and how is it counteracted [on the C162]?**

  The tendency to yaw out of a turn. Counteracted with a Frise Aileron and Differential Aileron.

- **Under a left turn, the inclinometer is left of centre. Respond.**

  The aircraft is slipping and requires left rudder input to balance.

- **Under a left turn, the inclinometer is right of centre. Respond.**

  The aircraft is skidding and requires right rudder input to balance.

- **Under a right turn, the inclinometer is right of centre. Respond.**

  The aircraft is slipping and requires right rudder input to balance.

- **Under a right turn, the inclinometer is left of centre. Respond.**

  The aircraft is skidding and requires left rudder input to balance.

- **What is overbanking?**

  A tendency to roll on a climbing turn, due to a greater AoA on the outer wing. Corrected with aileron.

- **What is underbanking?**

  A tendency to roll on a descending turn due to a greater AoA on the inner wing. Corrected with aileron.

- **What is a gentle turn?**

  Up to 15 degrees AoB.

- **What is a rate 1 turn?**

  A turn that takes two minutes, calculated by `(TAS + 7)/10`, approximately 15 degrees AoB for C162.

- **What is a medium turn?**

  Up to 30 degrees AoB.

- **What is the limit for a climbing turn?**

  15 degrees AoB.

- **What is the limit for a descending turn?**

  30 degrees AoB.

- **Apply a turn.**

  1. Lookout
  2. Select reference
  3. Select altitude
  4. Begin turn: ALAP
  5. Bank with aileron
  6. Balance for slip & skid with rudder
  7. Backpressure on elevator
  8. End turn: ALAP

- **What airmanship principles apply to turning?**

  Clarity on who is in control. Handing over & taking over.

- **What threats apply to the aeroplane during a turn?**

  The high-wing of the C162 obscures vision, managed with lookout.

- **What threats apply to the pilot during a turn?**

  Disorientation, managed with handing over.

- **What threats exist from the environment during a turn?**

  Terrain, managed with lookout.

Stalling *(20160104)*

- **What is the relevance of the Critical Angle of Attack?**

  The Angle of Attack (chord line to RAF) at which the lift coefficient is at its maximum and the aircraft stalls. Increasing AoA after Critical rapidly reduces the lift coefficient.

- **What is the effect of weight on an aircraft stall speed?**

  As weight increases, stall speed increases.

- **What is the effect of power on an aircraft stall speed?**

  As power increases, stall speed decreases.

- **What is the effect of flap on an aircraft stall speed?**

  Flap extension, stall speed decreases. Flap retraction, stall speed increases.

- **What is the effect of load factor on an aircraft stall speed?**

  As load factor increases, stall speed increases.

- **What is the HASELL process?**

  - **H**eight: Must recover by 3000AGL
  - **A**irframe: Configured (flap up)
  - **S**ecurity: No loose objects, hatches and harness secure
  - **E**ngine: Pressures and temps checked
  - **L**ocation: Not over built-up areas
  - **L**ookout: 360 degree clearing turn before commencing and 90 degree between each stall

- **An aircraft with Vs = [35-65]KIAS performs a [10,20,30,45,60] degree turn. What is the new stall speed?**

  ```
  LF = 1 / cos AoB

  New stall speed = Vs * (LF ^ 0.5)
  ```

- **What is a consequence of aileron in a stall?**

  Aileron on the stalled down wing will increase the AoA of the outer wing, resulting in wingdrop and possible spin.

- **What are the indicators and recovery of an impending stall?**
  - Slow and decaying airspeed
  - Nose-high attitude
  - Less wind noise
  - Controls less responsive
  - Stall warning (5-8KIAS above Critical AoA)
  - Control buffet
  - To recover, lower nose
- **What are the indicators and recovery of a developed stall?**
  - loss of height *(guaranteed)*
  - nose drop *(maybe)*
  - wing drop *(maybe)*
  - To recover, lower nose to level, add full power, right rudder. After sufficient airspeed, raise nose slightly
- **What are common faults of stall recovery?**
  - lowering nose too far (do not exceed loss of > 100ft altitude)
  - delayed application of full power
  - pull up too quickly after recovery -> secondary stall
- **What threats exist in inducing a stall?**

  Low power setting can cause carburetor icing. Apply carburetor heat until stall warning, then turn off.

Circuit Emergencies *(20160212)*

- **What are the parameters for a go-around?**

  There are no specified limits. Set personal limits based on conditions, aircraft type, etc.

- **Execute a go-around**
  1. Full power
  2. Raise nose to cowl on horizon
  3. Flap up one stage, 30 to 20
  4. Achieve minimum 56KIAS
  5. At ~60KIAS, flap up one stage, 20 to 10
  6. At ~65KIAS, flap retracted, 10 to 0
  7. Raise nose to climb
- **Execute a flapless approach**
  1. Trim nose up
  2. Higher attitudes than normal
  3. Trim substitutes flap
  4. 75-80KIAS on base
  5. Power for speed
  6. 70KIAS approach
  7. Threshold on top of cowling
- **Execute Engine Failure After Take-Off prior to rotate**
  1. Close the throttle
  2. Apply maximum braking
  3. Exit the runway at nearest taxiway
- **Execute Engine Failure After Take-Off after rotate with runway**
  1. Lower the nose
  2. Close the throttle
  3. Land the aircraft on the remaining runway
  4. Apply maximum braking
  5. Exit the runway at nearest taxiway
- **Execute Engine Failure After Take-Off after prior to rotate without runway**
  1. Lower the nose to glide
  2. Select landing area within 30 degrees of heading

3. Commence a turn only if:
   - already commenced a turn
   - sufficient glide to runway