Wings over Holland

IFR SOP'S

VERSIE 20210519N Revisie 1 ©2021

NEDERLANDSTALIGE VERSIE

Deze procedures zijn van toepassing op alle IFR lesvluchten

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0.0 INTRODUCTION

This book describes how to operate in the IFR courses according the Wings over Holland Standard Operating Policy. Which is laid down in the Operations Manual, Training manual (TM) and Pilot Operating Handbook (POH).

The IFR courses at WHO consist of:
FNPT II: Single Engine IFR
Actual flying: Single Engine IFR
FNPT II: Multi Engine IFR
Actual flying: Multi Engine IFR

In this theory book no specific aircraft type is discussed. All procedures are written in general language and can be used for every aircraft type of WOH. Refer to the SOP books of the aircraft concerned for the correct speed/power/flaps etc. settings. Use these SOP books next to this theory book. The procedures are based on an aircraft with retractable gear and constant speed propeller. When you are operating an aircraft without this equipment you must ignore those items.

Where in this theory book the expression “he” is used you can also read “she”.

Material used from:

- Jeppesen Airway Manual
- Pans-ops (e.g. doc-8168)
- Operation Manual
- Training Manual

1.0 INSTRUMENT FLIGHT BASIC SCAN

1.1 GENERAL

When an aircraft is in flight, there are two parameters which control its flight path and behaviour. Those parameters are the aircraft’s attitude and the selected power. When you have those two parameters under control, you can handle an aircraft. When flying in VMC, you can see the attitude of the aircraft using the horizon outside. With the experience gained from flying VFR, you can control the attitude of the aircraft without continuously paying attention to the horizon. Looking from wing tip to wing tip, you automatically observe the attitude whenever your eyes passes over the aircraft’s nose. The process of observing a difference when the attitude no longer is the same as which you had chosen is often subconscious. Also, your balance senses aid in judgement.

When flying in IMC, the aircraft will not behave any differently. You as a pilot however, will notice that the aircraft will not let you control it in the same natural manner as while flying in VMC. It remains necessary to keep the same parameters as before under control. The big difference is the way you obtain and interpret the information to keep the situation under control.

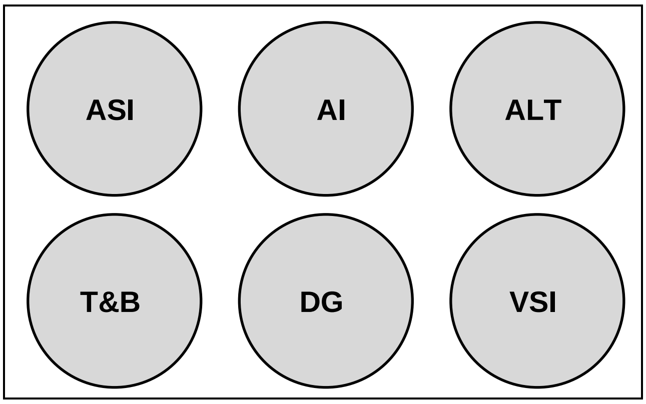
If the desired power setting for a certain flight situation has been selected, one variable remains; Attitude. (Usually large deviations in attitude occur in the starting phase of IFR flying training). You no longer read the attitude of the aircraft on an enormous horizon outside, but on an artificial horizon (attitude indicator or AI) the size of a coffee cup.

The changes in indication on that instrument have big consequences on your flight path. You have to learn to control the aircraft by using that instrument. Around the artificial horizon are five other flight instruments, which allow you to check if the attitude you have chosen, provide the flight path you want to follow. When you look at those instruments at random, you will see that the attitude of your aircraft will vary a lot. So it is the best to use a fixed pattern. The method which we use for that is called “scanning”.

Most aircraft have basic six flight instruments.

The most important is the artificial horizon and for this reason this instrument is in the middle of the panel, in front of the pilot.

The other instruments have been placed around the AI. Those are the altimeter (ALT), vertical speed indicator (VSI), the directional Gyro (DG), the turn and bank indicator (T&B) and the airspeed indicator (ASI).



When we scan the indications on these instruments, we do so in a fixed pattern. Each time we return to the AI, before we scan the next instrument. Initially this method seems rather difficult and it requires some necessary exercise, but soon you will be able to do it in the correct manner.

Therefore it is important that you know of each instrument what indication you should see. When for example you are at an altitude of 2000’, you have that value already in mind before your eyes have seen the altimeter. The advantage is that you will see and correct deviations more rapidly.

Reading the indication first and then compare it with the desired value, to assess whether and how you have to correct it, will slow down your scanning considerably. The faster you scan, the more accurate you will fly. As said before, scanning requires some exercise.

1.2 THE HORIZONTAL FLIGHT

The objective during the horizontal flight is to maintain altitude, direction and speed (coordinated). So, in this flight situation the following instruments shall be scanned: AI, ALT, DG, ASI. We start and finish at the AI and look at the other instruments clockwise. The scan will be as follows:

AI - ALT - AI - DG - AI - ASI - AI

When we are back at the AI, we repeat this pattern again etc.

1.3 THE CLIMB

During the climb we want to maintain direction and speed resulting in the following scan:

AI - ASI - AI - DG - AI

Of course we have to pay attention to see when we reach the desired altitude. However it's not important in a climb lasting several minutes, to constantly scan the ALT. That will only slow down the scan cycle. It's sufficient to incorporate the ALT in the scan from time to time.

1.4 THE DESCENT

Descents are made with a fixed rate of descent of 500 to 800 feet per minute (fpm). Furthermore we want to maintain direction and speed. The scan will then be as follows:

AI - ASI - AI - DG - AI - VSI - AI

The rate of descent during instrument approaches is stipulated by the descent angle (generally 3º) and the ground speed. At 3º descent angle you obtain the desired rate of descent from the next formula: (GS x 5) + 50.
Therefore with a ground speed of 100 knots the average rate of descent (also called reference rate of descent) is 550 fpm.

1.5 THE HORIZONTAL TURN

All instrument procedures are based on Rate one turns. These are turns with a constant rate of turn (3º per second). During the turn we want a "Rate one" indication on the turn and bank indicator. Furthermore we have to maintain altitude in the horizontal turn. Therefore it is also important that the vertical speed is scanned. That gives direct information on altitude gain/loss. The scan in this case is as follows:

AI - ALT/VSI - AI - T&B - AI

For making a rate one turn we need a certain angle of bank, depending on the airspeed. For stipulating the required angle of bank, we use the next formula:
(10% X TAS) + 7 (PAY ATTENTION TO USE TAS IN KNOTS).
For a rate one turn with a speed of 100 knots, we need 17º angle of bank.

1.6 ALL SCANS TOGETHER.

Horizontal flight	AI - ALT - AI - DG - AI - ASI - AI
Climb	AI - ASI - AI - DG - AI
Descent	AI - ASI - AI - DG - AI - VSI - AI
Horizontal turn	AI – ALT/VSI - AI - T&B - AI
Climbing turn	AI – ASI - AI - T&B - AI
Descending turn	AI - ASI - AI - T&B - AI - VSI - AI

Carrying out a flight transition (e.g. starting a climb) will be accompanied by a change in attitude of the aircraft. To correctly carry out such a flight transition, you have to focus on the artificial horizon. From the current attitude you choose a new attitude for the next flight phase. When initiating a climb your attention should be concentrated on the artificial horizon. Your eyes remain aimed at this instrument until the new attitude is stabilized. Only then can you proceed with the scan which belongs to this flight situation. It is tempting in flight transitions to look at other instruments, but that will result only in negligent flying. With “chasing the needle” you have the risk to exaggerate attitudes, because the instruments you are now looking at are slow in their indication and your attention to the attitude has disappeared. We fly an aircraft using attitude and power setting, remember?

1.7 LIMITED PANEL

1.7.1 GENERAL

In most aircraft with a conventional instrument panel, the artificial horizon and the directional gyro are operated on suction, which is provided by an engine-driven vacuum pump. When this pump fails, or the vacuum gauge breaks, these instruments can no longer be used. During training attention is given to instrument flying without the help of these vacuum driven gyros.

Important to know is that a malfunction of your AI and DG generally happens very inconspicuous and can lead to hazardous flight situations. Your first task is to keep your aircraft under control! When you suspect a vacuum problem, one should first seek confirmation on the suction indicator. Secondly, you will switch over to different scan cycles, as described below.
Your primary instrument is now unserviceable and you have to obtain your primary information from somewhere else. You have to use the altimeter for pitch-information and the turn and bank indicator for bank information. Your primary instruments are therefore the altimeter and the turn and bank indicator. It is very important that you carry out corrections and attitude changes carefully. Most of the remaining instruments are slow in their indication causing a risk to exaggerate control movements.

1.7.2 Level Flight

Primary information is to be obtained from altimeter (pitch) and turn coordinator (direction).
Back up instruments are vertical speed indicator, airspeed indicator and magnetic compass.
Do not change power unless alterations from intended circumstances are becoming large.

1.7.3 ALTITUDE CHANGES

The vertical speed indicator shows changes in altitude. Operating the elevator control causes the vertical speed to change to whatever indication you require. That means that you need to know which rate of climb you should obtain in each configuration during the climb (know your aircraft performance!). Only when this vertical speed has been stabilised you can proceed with your scan.

1.7.4 Climb

Ease back on the control wheel and set climb-power at the same time.
Watch the change on the airspeed indicator, which is the primary instrument during a climb, and the reading on the vertical speed indicator.
Re-trim the aircraft when climb speed is obtained.
Check turn coordinator and magnetic compass to maintain proper direction.
Ease the control gently forward when the aircraft is approximately 100 feet away from the intended altitude.
Stop the altimeter and vertical speed.
Re-trim when stabilized.
Set cruise power when desired cruise speed is obtained

1.7.5 Descent

There is no fundamental difference between climb and descent, except that descents can be made with all kind of power settings, resulting in different attitudes.
Always try to maintain the intended speed first and correct power to achieve proper rate of descent.

1.7.6 Turns

Establish a rate one turn on the turn coordinator.
The altimeter is the primary instrument in level turns whereas airspeed/vertical speed indicators are closely watched during climbing and descending turns.
In turbulence the turn coordinator can become very erratic and an average should be deducted.
Magnetic compass is useless during a turn; timing should be performed for changes in direction (rate one means 3° per second). Start your timing when rolling in the turn and roll out after two minutes.

Be aware of items listed below:

- be very smooth on the controls and don't chase instruments.
- know the normal readings of the instruments for the complete flight envelope. (Performance of the aircraft.)
- the aircraft should be trimmed properly. An out of trim situation can be observed and easily corrected on full panel, but is more difficult when flying limited panel.
- parameters to control the aircraft in the pitching plane are the altimeter, airspeed indicator and vertical speed indicator whereas lateral control is maintained with the aid of the turn coordinator and magnetic compass.
- check the magnetic compass regularly .

1.7.7 ALL LIMITED PANEL SCANS TOGETHER

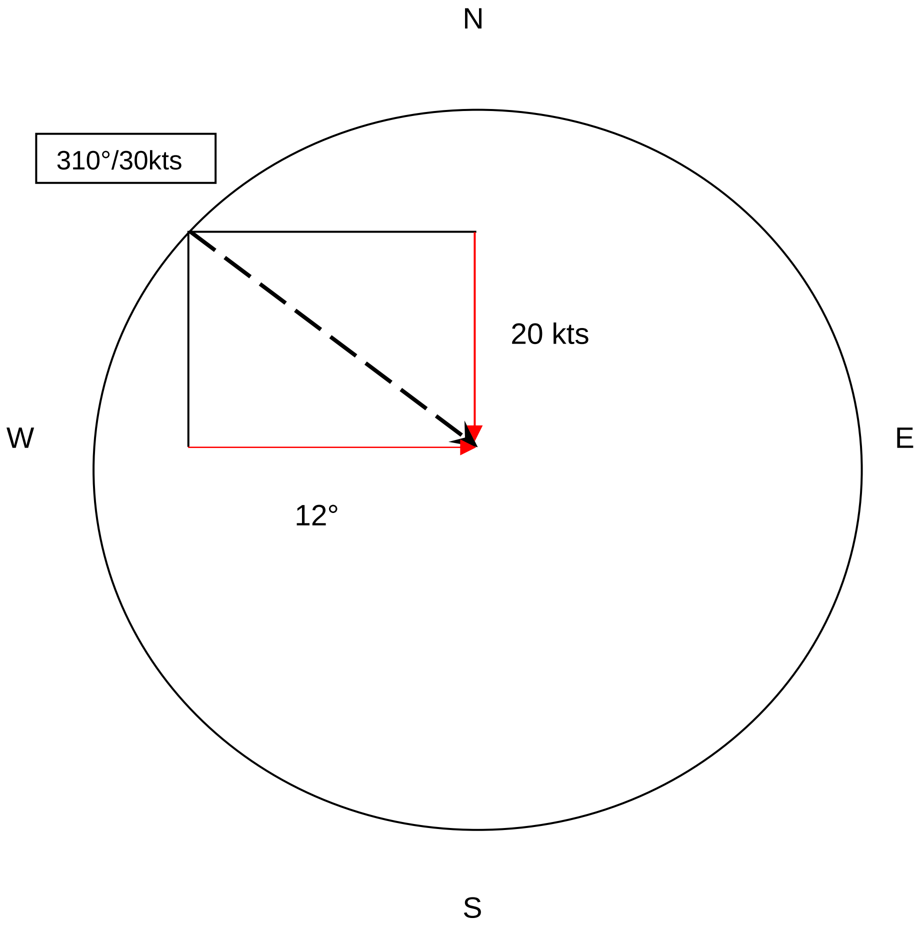
Horizontal flight	ALT - T&B - ALT - ASI - ALT
Climb	ALT - T&B - ALT - ASI - ALT
Descent	ALT - VSI - ALT - T&B - ALT - ASI - ALT
Horizontal turn	ALT - T&B - ALT
Climbing turn	VSI - T&B - VSI - ASI - VSI
Descending turn	VSI - T&B - VSI - ASI - VSI

1.8 CORRECTIONS FOR WIND

Track Wind Corrections and crosswind corrections are determined by projection on your Directional Gyro.

For example:
Given: wind: 310°/30kts
speed: 120 KTAS
heading: 360°

Solution: First determine maximum crosswind correction: 60 / TAS x V_{wind} = 60 / 120 x 30 = 15°



So when projecting the wind component on the West-East axis you will have a crosswind correction of about 12° (it is about 4/5 of the max of 15°). When projecting the wind on the North-South axis you will have a headwind of about 20 kts (it is about 2/3 of the max of 30kts).

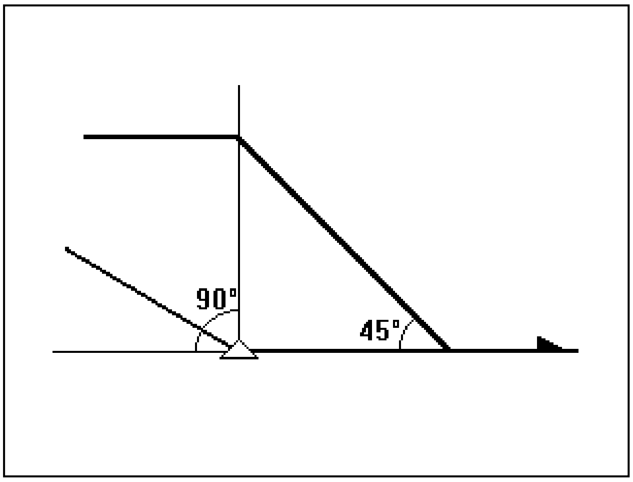
2.0 INSTRUMENT PROCEDURES

2.1 OUTBOUND INTERCEPTIONS VOR.

Before starting an interception, always determine your position!
There are two possibilities for outbound interceptions:

1. You have already passed the beacon: You can immediately fly towards the outbound track under an angle of 45 degrees.
2. You have not yet passed the beacon: First you fly parallel to the track to be intercepted, until you are abeam the beacon. Then you can intercept the outbound track under an angle of 45 degrees.
   If favourable, you can also fly directly to the beacon, and then pass the beacon on the outbound track.

Example: outbound interception on HSI
Present radial 045
Intercept radial 090.

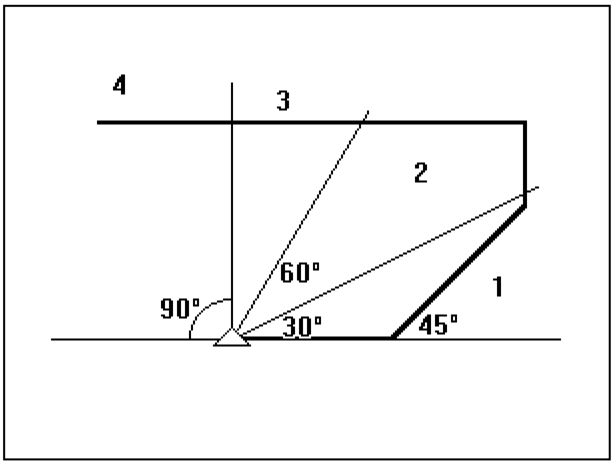


2.2 INBOUND INTERCEPTIONS VOR.

There are four possibilities for inbound interceptions:

1. You are within a sector of 30 degrees with respect to the track to intercept: You can intercept the track under a heading of 45 degrees.
2. You are within 60 degrees, but more than 30 degrees out of the track to intercept: You firstly fly on a heading perpendicular to the track, until you are in sector 1. Then follow the procedure for sector 1.
3. You are within 90 degrees, but more than 60 degrees out of the track to intercept: Now you fly on the reciprocal heading of the track to intercept for two minutes. When the 2 minutes have passed and you are in sector 1, you proceed further with step 1. Otherwise proceed with step 2.
4. You are more than 90 degrees out of the track to intercept: Now you also have to fly the reciprocal heading, but now during three minutes as from the moment on which you pass abeam the beacon. If you then end up in sector 1 you proceed with step 1. Otherwise proceed with step 2.

Example: section 4 interception on HSI
Present: radial 360
Intercept radial 210 inbound



2.3 INTERCEPTIONS ADF

The procedures of NDB track interceptions are basically the same as VOR track interceptions, but a few differences exist.

Different definitions are used.

- Tracking QDM 360 means to fly a track of 360º towards the station. (This would be similar to flying radial 180 inbound).
- Tracking QDR 360 means flying away from the station on a track of 360º.
  (This would be similar to flying radial 360 if navigation would take place on a VOR).

  Do not use the definitions for NDB's in relation to VOR's and the other way around, because they are specifically inherent to NDB and VOR navigation.

Example: outbound interception on ADF.
Present QDR 040.
Intercept QDR 090.

Example: Inbound interception on ADF
Present QDM 090 (QDR 270)
Intercept QDM 325

2.4 WIND CORRECTIONS DURING INTERCEPTIONS

During interception procedures (except flying a published track), we normally make no heading corrections for wind. The reason for this is that, using this method, you can always use the “tic markers” on your directional gyro or HSI. When necessary due to high wind conditions and small distance to the station, we can make corrections for wind instead of using the “tic markers” .

Always make a visualisation on your DG/HSI!

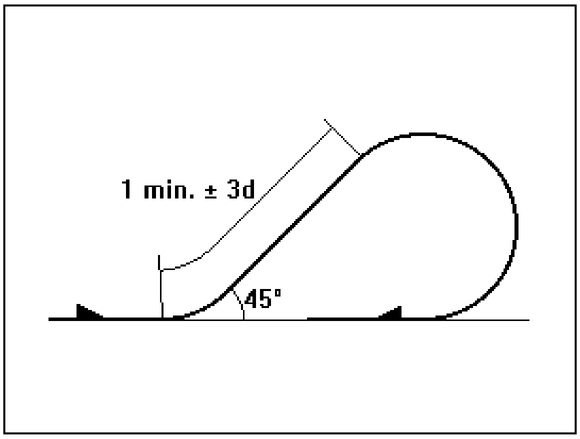
2.5 PROCEDURE TURN

45º/180º procedure turn

Situation: you fly on a certain track. At a certain moment you have to fly the same track in opposite direction. Flying on that track you experience a certain drift (D). as a result of the wind for which you correct.

You start timing when you start the turn and fly a heading 45 degrees with respect to your old track. After 1 minute +/- 3D (3 x the drift experienced on in/outbound leg) turn to the reciprocal to intercept the old track but now in opposite direction. If necessary you fly towards this track again under an angle of 45 degrees to intercept. When the first turn is to the left, we call it at a left-hand procedure turn.

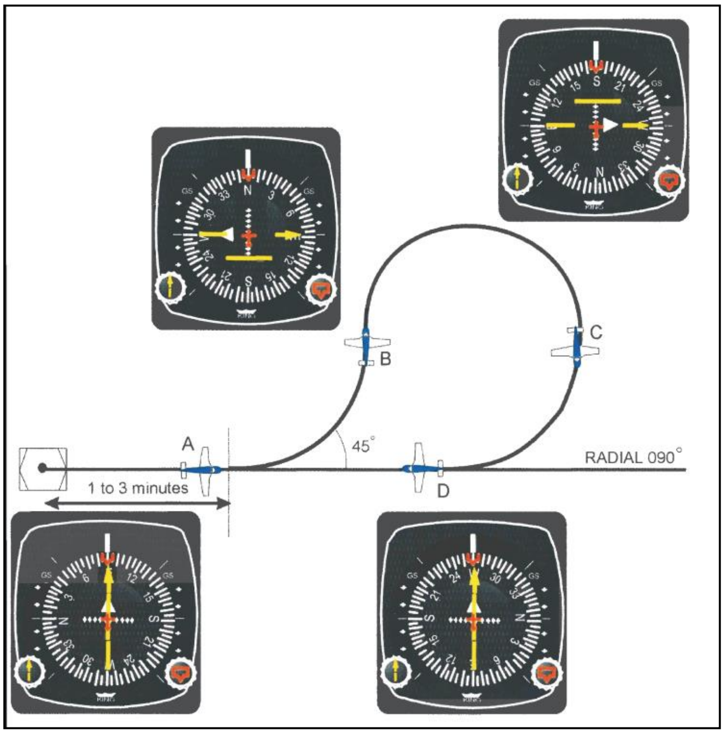
NB: If the first turn is into wind, the timing will be 1 minute + 3D!



80º/260º procedure turn

Example:

A. Aircraft is tracking radial 090 outbound and is requested to reverse track.
B. Pilot turns 80º away from the outbound track, followed by a turn of 260º in the opposite direction.
C. Somewhere during the turn he selects the reciprocal track 270º.
D. Procedure turn accomplished; the aircraft is tracking radial 090 inbound.



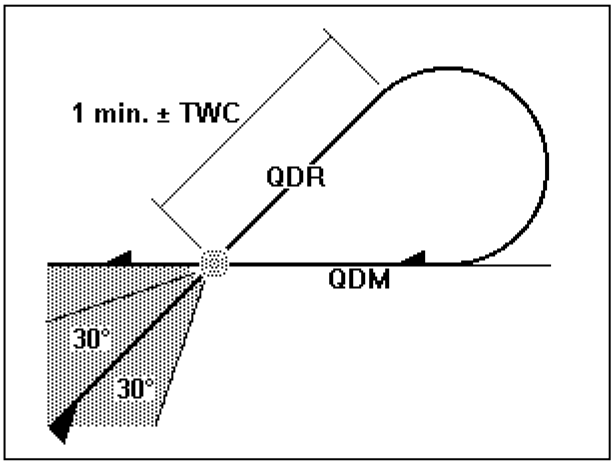
Wind corrections

When the first turn of 80 degrees is made into the wind a 2D correction is made. (drift on the original track).
When the wind is blowing from the opposite side no time correction is possible. Therefore the pilot should choose a proper heading to intercept the desired radial.

2.6 BASE TURN

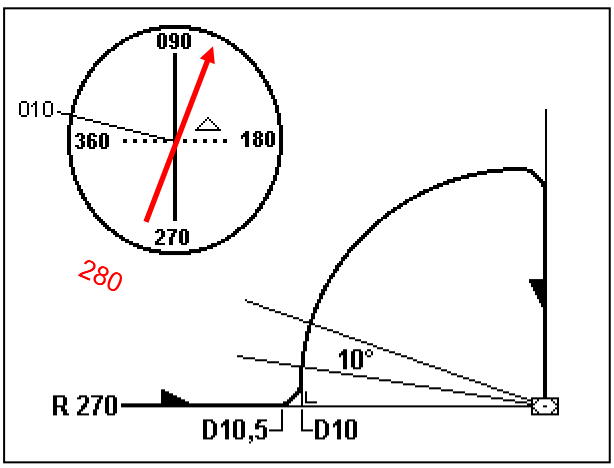
The base turn is a published procedure. It is not necessary that we start on the same track as on which we finish. So we intercept a published track from the beacon and intercept a published track to the beacon. We are only allowed to fly this procedure after ATC clearance when we fly towards the beacon from a certain position (the shaded part in the picture), basically defined by two angles of 30º on each side of the extended outbound track.

However if the reciprocal track (this is the track after the turn has been completed) is not within the entry sector, you may expand the sector up to the reciprocal track. Timing after passing the beacon is usually 1 minute (no wind) but can be published differently. Timing is corrected for track wind (1 minute +/- 1sec per kt TWC).



2.7 DME ARC

The DME arc is a published procedure usually based on a co-located VOR-DME station. The aim is to fly a path around the beacon with a constant distance to the beacon. On a certain distance in advance (generally 0.5 NM, but depending on actual groundspeed) you start the arc by turning to a track perpendicular to the next ten radials. (By flying perpendicular to the current radial you maintain a constant distance to the beacon, but this is in our aircraft not possible) When the VOR needle is centred you select the next ten radials and fly perpendicular to those. In this example you are flying on R270 inbound. (track 090) The depicted procedure is a left hand arc.(**first** turn to the left, but all turns thereafter are to the right, or clockwise)
We started on R270, so select R280 and fly perpendicular to it.(= track 010) When the VOR needle is centred we repeat this procedure until we reach the desired radial inbound. Of course we set the heading bug each time corrected for the wind.
If the DME distance increases, we correct towards the beacon (TO/FROM indicator) and if it decreases, we correct towards the outside by maintaining the heading.(postponing the turn).



2.8 HOLDING

Before entering a holding the PF must perform a holding briefing.

Start reducing speed in sufficient time (±3 min.) to arrive over the fix at holding speed. The holding power setting is 55%.

The holding is a waiting pattern, which is flown with respect to a fixed point and lasts in no-wind conditions 4 minutes. A NDB is frequently used as such a point. The direction in which the holding must be flown will also be given. In a standard holding all turns are made to the right. A holding can also be flown on a VOR or on a VOR/DME fix. See the picture below which is an example of a standard holding on radial 090 inbound to the VOR.

To remain within the holding area, the pilot has to correct for wind. Pilots should attempt to maintain the track by making allowance for known wind by applying corrections to both heading and timing during the entry and while flying in the holding pattern. We time 1 minute on the outbound leg in no-wind conditions. This timing for the wind is corrected for on the outbound leg, with 1 second per knot of tailwind component (TWC) or headwind component (HWC)

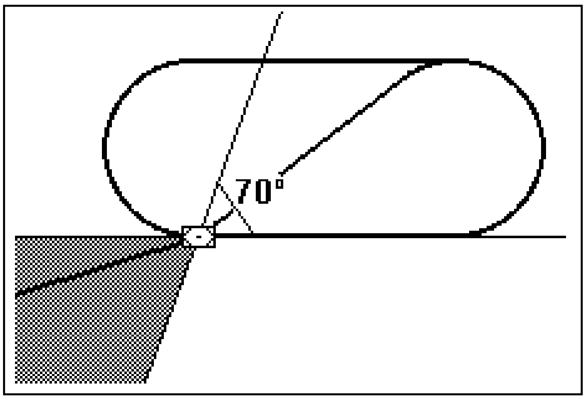
2.8.1 ENTRIES

The holding can be entered from every direction. However the beginning of the entry is different. That depends on the flight direction at which we start.

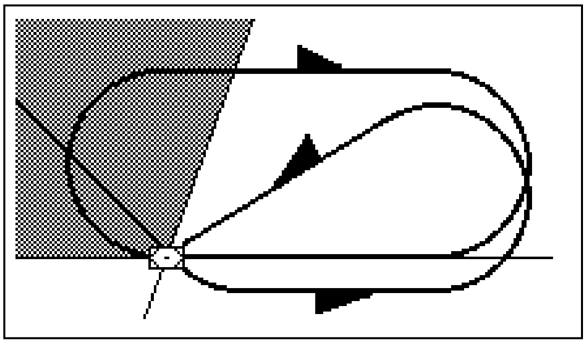
2.8.2 THE OFFSET ENTRY

When we have a heading on which we approach the holding from the shaded part, we fly pass the station under a track of 30 degrees with respect to the holding direction. After 1 minute we turn to intercept the inbound leg. Of course we correct the timing for wind with 1 sec/kt TWC

Example: Holding with inbound leg on radial 140 (outbound track is track 140º).
Present on radial 270 inbound. Entry will be offset.



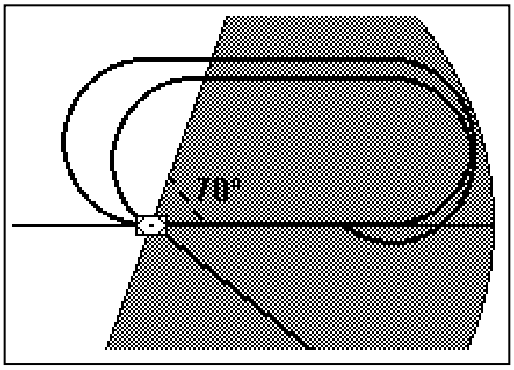
2.8.3 THE PARALLEL ENTRY



When we approach the holding from the shaded part as in the picture to the right, we fly beyond the station and fly a track parallel to the holding. Here we also time 1 minute, corrected for the wind.

Afterwards we make a turn opposite to the holding direction! Then we fly inbound to the beacon. Sometimes it is preferable to intercept the inbound track before you pass the station at the second time.

2.8.4 THE DIRECT ENTRY

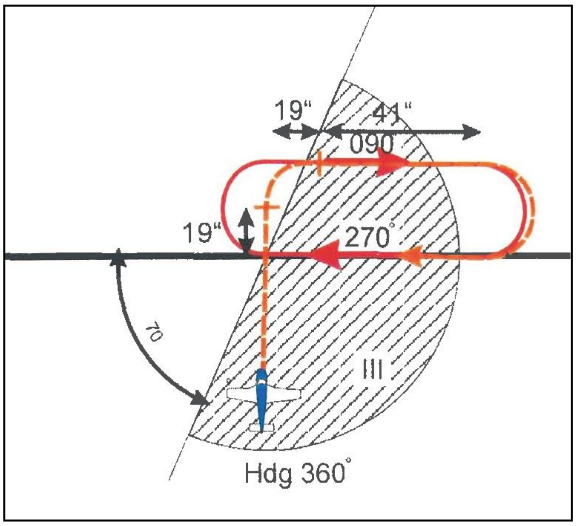


In this last method we are flying on a heading at which we can fly directly to the holding, however, because the first turn of the entry contains generally no 180° track change, we nearly always end up within the holding pattern. This means that we still have to intercept the inbound leg. You are expected to be established when you pass the fix for the second time!

2.8.5 SPECIAL DIRECT ENTRY

In some cases you fly inbound to the holding fix at a track perpendicular to the outbound track. In this case we make a special direct entry. We start timing when passing the beacon and time for 19 seconds during no wind conditions (apply 2D correction during other wind conditions).

This is equal to the turning radius of a rate one turn. After this timing, turn to the outbound leg. The timing on the outbound leg is now 41 seconds instead of 1 minute (no wind).



3.0 SINGLE PILOT PROCEDURES

This part describes the single pilot procedures which can be used on single engine and multi engine aircraft of WOH. When reading this chapter use the applicable SOPs of your aircraft/FNPT II as an appendix for the correct settings.

3.1 CREW CO-ORDINATION AND MONITORING DURING INSTRUCTION FLIGHTS

In most crew co-ordination procedures the division of duties is laid down by the terms PF (Pilot Flying) and PM (Pilot Monitoring). The PF occupies the LH seat, the PM the RH seat. The pilot in the LH seat is the acting Pilot In Command.
During training flights the student is the PF and the instructor the PM, holding final responsibility for the flight as PIC.

During all phases of flight disciplined crew co-ordination and communication will enable the crew to be permanently aware of each other's actions, aircraft configuration, system status, aircraft position and ATC communication. All crew actions and tasks are to be monitored by each pilot. Errors in judgment or deviations from standard procedures are to be reported to the other pilot without delay.

The PF is responsible for aircraft handling and navigation. In this respect the following duties may be distinguished:

- **Monitoring of:**
  Configuration
  Flight path
  Navigation
  Flight progress
  Fuel state
  Weather

- **Performing actions and set-ups for:**
  Configuration
  Navigation
  R/T
  Administration

The PM has an overall monitoring task. He shall:

- inform the PF in case of deviations from the intended flight path or from the standard operating procedures

Standard warning calls are:

- APPROACHING when during climb or descent the aircraft becomes less than 500 ft from the cleared altitude or flight level.
- BANK when the applicable maximum maneuvering bank limit is exceeded.
- SPEED HIGH/LOW when the speed deviates more than +5/ -5 KIAS from the correct value in case accurate speed control is essential.
- SINK RATE during approach, when the rate of descent exceeds 1000 ft/min.
- ALTITUDE when altitude deviates more than 100 ft from the desired altitude
- HEADING when heading deviates more than 10 degrees from the desired heading

If the instructor decides to take over control, he will clearly state MY CONTROLS. If the PF wants to hand over control he will clearly state YOUR CONTROLS. Any transfer of control shall be acknowledged. System handling by the PF shall never interfere with his main task of. flying the aircraft.

Altitude, direction and speed are the basics of flying the aircraft, the explanation of these words are:

- altitude: the actual altitude versus required altitude, altitude change due to procedure (sid, star, atc), the altitude for a safe flight maneuver, the altitude according plan etc.
- direction: the actual direction versus required direction, change of direction due to procedures or atc instructions (etc), the direction needed for approach, the direction needed for a safe flight maneuver etc.
- speed: the actual speed versus required speed, the change of speed due to configuration change (example during final approach), the speeds according SOP, the speeds according aircraft limits, the speeds the pilots flying wants to fly etc.

When change of controls is needed, hand over controls and give present altitude, speed, heading and further instructions.

The PF will perform required actions in such way that different actions do not interfere with each other. For example: when gear and flap settings are to be altered and the first action is “GEAR UP” the next action “FLAPS UP” will not be done before the completion of the gear cycle “GEAR IS UP” is given.

Commands for actions taking time for completion will be repeated by the PF when the action actually is completed. For example: PF selects “GEAR DOWN”. and when all three gear lights illuminate PF calls “GEAR IS DOWN, THREE GREENS”. The PM also checks the three greens and confirms: “THREE GREENS”.

Before making the selection the PF and PM will ensure that operating limitations and SOP’s allow the configuration change. Flaps extension and retraction should always be done in stages and the next higher or lower setting not be selected before the previous setting has been obtained.

In case of pilot incapacitation, the pilot flying should follow the crew co-ordination procedures and call out warnings and actions incapacitated pilot.

3.2 CHECKLIST USE

All normal checklists can be performed by memory in flight but must be checked with the checklist. The after takeoff checklist, downwind and landing checklist in the circuit pattern can be performed by heart and the checklist shall not be read.

Whenever the aircraft is stationary on the ground the PF reads and performs the items out loud.
In these cases the both PF and PM give the reply:

- the item “take off clearance – received”
- the item “gear – down”
- the item “brakes – checked”

3.3 CREW BRIEFINGS

The objective of a crew briefing is to focus the minds of the crewmembers to the part of the flight that is coming next. A good crew briefing covers all relevant aspects, preferably in a fixed / chronological sequence and in a clear manner. By doing so, the phase of flight that the crew briefing covers has already run through the minds of the crewmembers. This provides clarity between the crewmembers about what can be expected. As a consequence there will be a calm atmosphere in the cockpit and mental space to adequately react to ever changing variables. Keep crew briefings concise, this ensures a better mental alertness of the other pilot.

Good timing of the crew briefing is important. Preferably this is done at a moment when the workload in the cockpit is low. For departure it can be done after cockpit set-up. For approach, just before top of descent is a good moment. When workload in flight is high, the crew should create extra time by asking for radar vectors or a holding pattern. When this is not feasible, one could cut the briefing in pieces and brief every aspect coming up separately.

A standard crew briefing does not exist. The content of the crew briefing is the responsibility of all cockpit crewmembers. This means that all crewmembers will have to study the departure/approach procedures. Thereafter, the pilot flying (PF) gives the crew briefing on behalf of the whole cockpit crew. After completion he must actively look for reactions or questions from the other crewmembers.

A fixed sequence in a crew briefing avoids that things are left out. Furthermore, the crewmembers know what sequence to expect and this provides a better mental alertness to the correctness of the crew briefing. A helpful aid to memory is the abbreviation ANWB, which will be explained hereafter.

- **A;** stands for aircraft. With this the existing technical status of the aircraft is meant. After an abnormal the impact of this failure should be mentioned during the briefing. For example, it is no use to brief a cat III approach when the autopilot is unserviceable.

- **N;** stands for NOTAM. It reviews important NOTAM information in the briefing. For example, it is no use to brief an ILS when the glide path is unserviceable.

- **W;** stands for weather. Both pilots will have to mentally translate the ATIS information to visualize the flight phase coming up. For example; is it possible to return to the airport of departure with an engine failure? Or during approach; when will the crew see the runway? This will have effect on the way the autopilot / flight director system (AFDS) is used. Also, it is important that the crew is aware where to expect the runway in relation to the longitudinal axis of the aircraft to enable a smoother switch-over to visual flight.

- **B;** stands for briefing. Normally, the expected route is briefed here in a chronological order, including crew co-ordination. Also, for take-off, engine out procedures will be briefed. When after the crew briefing situations arise which make amendments on the crew briefing necessary it has to be updated. Only the change and the impact on the operation have to be briefed. Giving a good, consistent crew briefing is an art that can be mastered only with practice in many different situations. Crews that give good crew briefings tend to perform better than those who don't, especially in situations when workload is high.

3.4 DEPARTURE CREW BRIEFING

The PF shall preferably give the departure crew briefing before engine starting. It shall be completed or confirmed after receiving the ATC airway clearance before entering the runway.

The departure crew briefing shall cover the following items (in chronological order):

- A: Airplane status
- N: Notams
- W: Weather
- B: Briefing, which shall cover the following items in chronological order:
  1. Crew co-ordination procedures
  2. Taxi-out route
  3. Kind of Take-Off
  4. Emergency procedures during Take-Off
     - Before Vr: abort take-off (SE and ME)
     - After Vr and enough runway left: land at remaining runway (SE and ME)
     - After Vr not enough runway left: land straight ahead (SE)
     - After Vr not enough runway left IMC: radar vectors for a …..approach (ME), fly above MOCA
     - After Vr not enough runway left VMC: join circuit for full stop landing (ME)
  5. Departure procedure according ATC clearance (SID)
  6. First cleared altitude / flight level
  7. Transition altitude
  8. Minimum Sector Altitude
  9. Operational impact of local situation, weather and aircraft deficiencies, if not yet covered.

3.5 ARRIVAL CREW BRIEFING

For the arrival crew briefing a helpful aid is the abbreviation “AAAAA” (the five A’s).

- **A;** stands for ATIS: Listen out the ATIS.
- **A;** stands for ATC: ask ATC for the runway in use and other necessary information.
- **A;** stands for Avionics: In order to prepare for the arrival or approach the PF may (but is not obligated to) switch over control of the aircraft to the PM using the call “YOUR CONTROLS”. The PF studies the procedures, makes notes for himself and as far as possible in the present flight phase may prepare the NAV/GPS/COM set-up. After completion of preparations the PF will resume control of the aircraft using the call “MY CONTROLS”.
- **A;** stands for “Approach Briefing”: The expression “ANWB” will be used as a guideline for the approach briefing. When arriving at the letter “B” the PF will brief the PM on the intended procedures and NAV/GPS/COM set-up.
- **A;** stands for Approach Checklist: perform the approach checklist when cleared to an altitude.

The arrival crew briefing shall cover the following items (in chronological order):

- **Holding briefing** (if not already given)
  - Holding speed and max holding speed
  - Beacon / Fix
  - Holding over left/right
  - Holding entry
  - Minimum and/or maximum holding altitude
  - Inbound track
  - Questions?

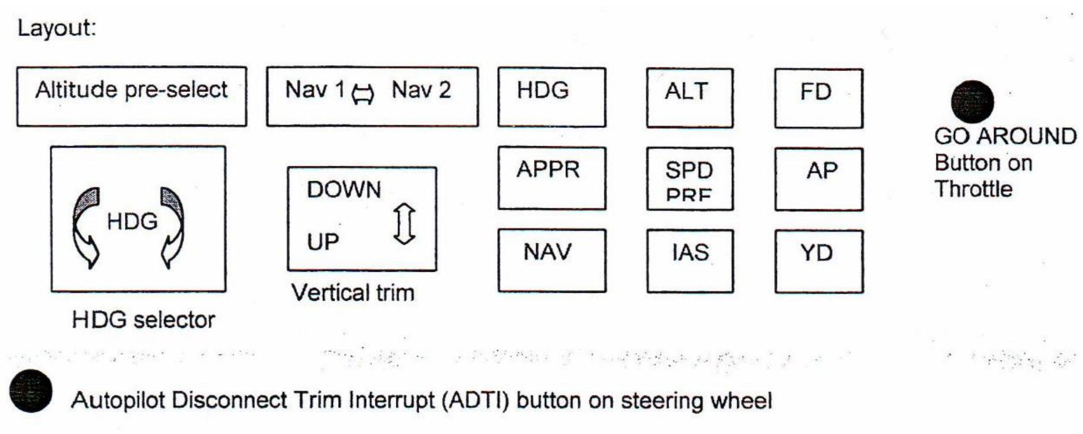
- **Approach briefing**
  - A: Atis
  - A: Avionics
  - A: Approach briefing:
    1. A: Airplane status
    2. N: Notams
    3. W: Weather
    4. B: Briefing:
       - Top of descent
       - Route (STAR)
       - Kind of approach
       - Chart number …… effective from……….at ……
       - Based on VOR / locator / etc.
       - All mentioned altitudes are minimum altitudes (only for a non-precision approach)
       - Final approach course
       - Final approach altitude
       - Start descent at intercepting G/S (ILS) or at descent point
       - Expected Rate Of Descent (ROD)
       - Altitude at outer marker (or outer marker position)
       - Decision altitude / minimum descent altitude
       - Runway elevation
       - After landing vacate runway via……..to…….
       - Missed approach procedure
       - Airport elevation
       - MSA
       - Approach configuration and speed
       - Questions?
  - A: Approach Checklist

4.0 FLIGHT DIRECTOR AND AUTOPILOT (FD & AP) FNPT-II

The FNPT II is equipped with a Flight Director and Autopilot.

This paragraph is meant to learn the basic rules for flying with Flight Director and/or Autopilot systems. There are differences between the FD/AP system on the FNPT II and the aeroplane. The next explanations are meant for use on the FNPT II only.
During training the Flight Director/Autopilot shall be used subject to the instructors discretion and in accordance with the training syllabus.

The Altitude pre-select is situated on the instrument panel just left of the middle upper side.



For our training the “SPD PFR” and the “IAS” mode are not used.
On the FNPT II the “YD” is coupled to the “AP”. (As soon as AP is selected, the YD comes ON as well. When selecting “AP” off, the “ YD” stays on).)

The PF commands the FD.
The FD commands the yellow V-bar (or cross bars) on your attitude indicator.
When flying “manual” the PF will follow the FD-bar with his black V-bar on the attitude indicator.
When the PF does not agree with the indicated attitude of the FD, the FD should be disengaged using a double click on the ADTI button. (One click disengages the AP only, double click disengages both AP and FD.)
When flying “automatic” the autopilot will follow the FD, which is visible on the attitude indicator: the black V-bar will follow the yellow V-bar. The Autopilot can only be engaged when a Flight Director mode is activated.
The Autopilot is not certified for take-off and landing and so it is prohibited to use the Autopilot during take-off or landing.
After take-off the Autopilot may be switched on at 500 ft AGL when established in the climb and must be switched OFF above 150 ft. AGL before landing.

The actual mode is shown on the Flight Mode Annunciator panel (FMA) of the FD/AP. In the FNPT II the FMA’s are presented at the upper part (eye brow) of the ADI. Whichever mode is armed is yellow, the active modes are green. Selected modes are lit on the FD/AP panel.

Normally, since the PF is seated on the left in the cockpit, if flying in the “Nav” mode, the toggle switch nav-1...nav-2 is selected to nav-1 (Nav-1 on the HSI on the left side).

Modes to be used in <u>MANUAL FLIGHT:</u>

Take off: None: Altitude pre-select is set to the cleared level, but FD and AP stay OFF. The take of is performed on raw data.

Climb: After take-off when gear and flaps are "UP", activate the FD and push the HDG-button. (result: FD bar appears on ADI and HDG mode is showing green on the FMA of the ADI) The FD will command the FD-bar to maintain present attitude and selected HDG. Alterations in desired attitude will be made with the "pitch trim control" on the FD/AP panel. (The vertical trim adjusts the FD-bar only). The pre-selected altitude should be armed. (Push small button under altitude pre-select, altitude armed will show on FMA panel).

Cruise: Upon altitude capture the FD-bar will lower to the horizon on the attitude indicator (Altitude FMA changes to green. ALT button on FD/AP panel is lit). Normally during cruise you will fly either on the combination of "HDG" and "ALT" or the combination of "NAV" and "ALT". When flying in the NAV mode the selected radial in NAV-1 will be maintained (switch to NAV-1). To intercept a radial steer on an intercept HDG in "HDG" mode and select "NAV" on the FD/AP. The NAV-armed-FMA will appear, upon capture of the radial the color will change to green and the FD-bar will adjust to a new HDG to maintain the radial. Upon NAV-capture the "HDG" mode will automatically be switched OFF. (HDG FMA disappears, light in HDG-button is out.) In the NAV mode the FD will adjust for the necessary wind corrections. The HDG bug must be set to the actual aircraft HDG.

Descent: Before starting the descent pre-select new altitude and push "arm" button mode. (The FD is now flying basic attitude.) Set altimeter to QNH if descent is to be made to an altitude. Then select new altitude on altimeter pre-select and arm. (Altitude armed FMA on panel). Either HDG mode or NAV-mode may be maintained.

Start descent by adjusting FD-bar with vertical trim on FD/AP panel to an attitude for 500 ft/min ROD. Then adjust throttle(s) and mixture(s) as required.

Upon altitude capture the FD-bar will adjust to level flight.

Approach: Before engaging approach mode check:

If intercept is less than 90 degrees

- Correct NAV frequency
- Correct DME indications
- Correct HSI indications

Intercept final approach track using the HDG + ALT mode. On intercept course Approach mode can be selected:
push button APPR. On FD/AP panel. APPR. Armed FMA will appear.
Upon capture of the LLZ, the HDG mode automatically is disengaged.
Upon capture of the glide slope the ALT mode automatically is disengaged.
Approach flight mode annunciator on panel will change to green.

The normal sequence of standard call-outs shall be used, even when the runway is in sight at an early stage of the approach.

<u>Remember</u>: Independent of flying manually or automatically: **<u>ONE FLIES AT ALL TIMES!!</u>** (PF shall have one hand on the yoke and the other on the throttle(s) during approach. The thumb of the hand on the yoke should be close to the "autopilot disconnect button".)

It is the duty of the whole crew to check the selected (and called) modes of the FMA panel. The Appearance of the required FMA will be called out as “CHECKED”.
All mode changes shall be called by the PF.

Manual and automatic flight:

PF
▪ Select Flight Director mode. ▪ Call: “FLIGHT DIRECTOR ON”.
▪ Select heading mode. ▪ Call: “HEADING SELECT”.
▪ Select altitude hold mode. ▪ Call: “ALTITUDE HOLD”.
▪ Select Autopilot on/off. ▪ Call: “AUTOPILOT ON/OFF”
▪ Select Approach mode ▪ Call: “APPROACH MODE”.

To deselect altitude hold mode:

PF
▪ Select Altitude Mode off ▪ Call: “ALTITUDE OFF”.

When new altitude or level is selected:

PF
▪ Call: “……FT SET AND ARMED”.

5.0 FLIGHT PREPARATION

Flight preparation must be done before starting the flight. Use the WOH flight preparation checklist which contains all actions required for a safe and legal flight such as:

- mass and balance
- fuel calculation
- performance calculation
- weather interpretation
- pre-flight preparations and checks (incl. walk around),
- aircraft status,
- airport status
- notams
- papers needed on board
- navigation planning
- ATC flight plan & Slots
- etc.

6.0 ENGINE START

- For multi engine operations the NORMAL START SEQUENCE IS ENGINE 1 FIRST (which is the left engine seen from the cockpit), FOLLOWED BY ENGINE 2.
- The Before Starting Checklist must be completed.
  The engine start is performed according checklist by the PF. The student may ask the instructor to hold the controls during engine start, especially during high wind conditions. He gives the controls to the instructor by making the call: "YOUR CONTROLS". The instructor will reply with the call "MY CONTROLS".
- The PM must monitor the engine start procedure
- Starting should be planned in such a way that taxiing can be commenced without delay after starting the engine(s), and after completing the Before Taxi Checklist.

7.0 TAXIING AND BRAKING

7.1 BRAKING

Before releasing, or setting the parking brake, the throttle(s) must be retarded to idle. Before releasing the parking brakes first check outside left and right. Then the PF releases the parking brakes and calls: "PARKING BRAKES RELEASED". The PM responds: "CHECKED".

The brakes should be checked directly after the aircraft starts moving. For the purpose of testing the brakes by the PM, the PF remains in control of the aircraft. The PF gives the call: "CHECK YOUR BRAKES". After the PM has checked his brakes, confirmed with the call "CHECKED", the PF resumes normal taxiing (note: during brake check the aircraft should not come to a full stop).

Prior to setting parking brakes an external reference point to judge aircraft movement must be sought.
When parking brakes are set the PF must call: "PARKING BRAKES SET". PM responds "CHECK".

7.2 TAXIING

Taxi power to be used must be such to maintain a fast walking speed or a taxi speed adapted to circumstances. When this means that the engine runs unstable, more power will be selected to make the engine run stable. Frequently idle power will be selected in combination with intermittent braking to maintain the speed mentioned above. Reduce speed before entering a sharp turn. When the turn to be made is too sharp use brakes in addition to rudder to stay on centerline. For multi engine aircraft differential power may be added when rudder and brakes are not enough to stay on centerline.

8.0 TAKE OFF

8.1 NORMAL TAKE-OFF

The normal take-off is standard. WOH considers a normal take-off when there is sufficient ground roll distance (TORA) available. In case the TORA is equal or less than 110% TORR for normal take-off we will use the short field take-off technique as described in the next chapter.

8.2 PERFORMANCE SHEET

If an airport has more than one runway available for your flight, use data for the shortest or most unfavorable runway. If no data are available for TORA, TODA or ASDA separately, use published runway length.

For take-off performance calculations use the graphs or tables out of the performance chapter in the POH of the applicable aircraft.

Calculate the following items:

- TODR, compare this with the TODA
- TORR, compare this with the TORA
- Climb gradient / performance. For multi engine operations calculate the one engine inoperative climb performance and compare this with figures required for a safe take-off flight path
- ASDR, if available in the POH, compare this with the ASDA

8.3 NORMAL TAKE-OFF PROCEDURE

The normal T/O technique is: Line up at the beginning of the runway, set static take-off power, release brakes and apply full/take-off power, Take-off flap. Rotate the aircraft at the rotation speed with a rate of 3°/sec to approximately 8° pitch up. When insufficient runway length for landing is left, select gear up. At or above 200 ft HAA check flaps up and maintain the climb speed. At or above 500 ft HAA select climb power and perform the after take-off checklist.

Assure following actions for Take-off:

- Align the aircraft on the runway centerline
- Set static take-off power.
- Check and assess surface condition and crosswind component
- Immediately counteract any tendency to depart from runway centerline.

During take-off until at least 400 ft HAA the PF will maintain his right hand on the throttle(s) unless other actions require differently.

The normal minimum altitude for turns after take-off is 500 ft HAA. For noise abatement obstacle clearance and/or ATC reasons a lower altitude may be required. Do not turn below 300 ft. HAA.

Different maneuvering speeds after take-off with flaps up results in different maximum bank angle. Refer to the SOP of the applicable aircraft for those limitations.

The procedure below describes the take-off with use of flight director and autopilot. When not using this equipment those items must be ignored in the procedure!!!
All Flight Mode Annunciator indications must be called and confirmed by PF and PM

NORMAL TAKE-OFF

	FLIGHT PHASE OR EVENT	PF ACTION
1	**Before take-off**	• Set HDG bug on runway heading with wind correction.
2	**At take-off.**	• Call: "TAKE-OFF". • Check parking brakes released. • Advance power lever to static T/O power • Release the brakes • Set T/O power • Call: "T/O POWER CHECKED".
3	**Passing 60 KIAS**	• Call: "SIXTY".
4	**At Vr**	• Call: "ROTATE". • Smoothly rotate at ±3°/sec. to initial climb attitude
5	**Positive airborne with positive rate of climb and insufficient runway remaining**	• Apply Brakes. • Call: "BRAKES APPLIED". • Call: "GEAR UP". • Select gear lever up.
6	**When gear lights are out**	• Call: "GEAR IS UP".
7	**At or above 200 ft HAA**	• Select flaps up • Call: "FLAPS ARE UP"
8	**At or above 500 ft HAA**	• Call: "CLIMB POWER" • Select climb power • Call: "CLIMB POWER SET" • Select Flight Director • Call:"FLIGHT DIRECTOR" • Select Heading Mode • Call:"HEADING SELECT" • Arm Altitutude • Call:ÄLTITUDE ARMED" • Select Autopilot ON • Call:ÄUTOPILOT ON"
9	**Clear of obstacles and time permitting (V=normal climb speed)**	• Call: "AFTER T/O CHECKLIST". • Read after T/O checklist • Call: "AFTER T/O CHECKLIST COMPLETED"
10	**At Transition Altitude**	• Call: "TRANSITION, SET STANDARD ALTIMETER". • Set all altimeters to QNE • Call: "STANDARD ALTIMETER SET • Call: "CLIMB CHECKLIST". • Read checklist. • Call:"CLIMB CHECKLIST COMPLETED"
11	**500 ft before cleared altitude**	• Call: "APPROACHING".
12	**When flying at cleared altitude with vcr**	• Call:"CRUISE POWER" • Set cruise power • Call:"CRUISE POWER SET" • Call:"CRUISE CHECKLIST" • Read checklist • Call:"CRUISE CHECKLIST COMPLETED"

8.4 REJECTED TAKE-OFF (RTO)

Rejection of a take-off at high speeds can be hazardous, in particular on a wet or marginal runway. Therefore rejections at speeds above 60 KIAS should be confined to circumstances as mentioned below. The take-off must be rejected in case of:

- Engine failure / fire below Vr
- Control problems affecting safe aircraft handling.

Note: speeds above 60 KIAS are called “high speed regime”.

The rejection of a take-off is initiated by the call STOP. In the above-mentioned cases both pilots may call STOP. In all other cases the decision to initiate the rejection of a take-off is restricted to the captain. Once the rejection is initiated, it must be completed.

In order not to distract the attention of the crew during the rejection of a take-off, no information about the reason to reject will be given until the aircraft has come to a complete stop.

	FLIGHT PHASE OR EVENT	STUDENT ACTION
1	**Moment of malfunction**	• Call: "STOP".
2	**Rejection of take-off**	• Throttle(s) rapidly idle. • Apply maximum brakes and confirm: “BRAKING” • Hold control column slightly aft of neutral.
3	**When aircraft is stationary**	• Set Parking Brakes. • State nature of failure.
4a	**If there is a need for evacuation**	• Fuel Selector(s) - OFF. • Mixture(s) – IDLE CUT OFF • Inform ATC • Battery – OFF • Alternator(s) – OFF • Magnetos – OFF
4b	**If there is no need for evacuation**	• Perform Basic Failure Management

RTO FOLLOW-UP

Depending on circumstances:

- consider to vacate the runway
- consider towing the aircraft to a parking position.

9.0 CLIMB

9.1 PERFORMANCE SHEET

In the POH of your aircraft you will find a graph or table for time, distance and fuel to climb. When the conditions on which these graphs or tables are based differs from the WOH climb procedure we will use the following values for a normal or cruise climb: use 500 ft/min for time/distance calculations and for fuel consumption use figures for 75% cruise power. Always use the most unfavorable conditions for fuel calculations, so for the SID use the longest published SID.

9.2 CLIMB PROCEDURE

During the climb the PF maintains the climb power by adjusting the throttles until the full throttle position is reached. (correcting for decreased ambient pressure) Leaning is done according the procedures in the POH.

There are various types of climb. Those types are:

- **Normal climb or cruise climb**
  This climb is to be used for local and navigation training flights, independent of the intended training altitude/level.

- **Angle of Climb (V_x)**
  This climb gives a maximum altitude gain versus distance covered.

- **Best Rate of Climb (V_y)**
  This climb gives a maximum altitude gain versus time spent.

- **One Engine Inoperative Best Angle of Climb (V_{xse})**
  This climb gives a maximum altitude gain versus distance covered when experiencing an engine failure.

- **One Engine Inoperative Best Rate of Climb (V_{yse}/blue line speed)**
  This climb gives a maximum altitude gain versus time spent when experiencing an engine failure.

The correct sequence of actions for entering the above mentioned climbs are:

- Mixture(s) control(s) operative engine(s) - full rich
- Propeller control(s) operative engine(s) - climb setting
- Pitch - climb attitude

  ±5 KIAS before reaching the climb speed:
- Throttle(s) control(s) operative engine(s) - climb setting

CAUTION: V_x, V_y, V_{xse} and V_{yse} climbs are approved as long as engine temperatures remain in normal operating range. Check the engine instruments regularly and adjust mixture(s) and cowl flaps if necessary.

Speeds and power settings for the aircraft concerned can be found in your aircraft SOP book.

10.0 CRUISE

10.1 PERFORMANCE SHEET

The POH of your aircraft will give you graphs or tables to calculate the cruise performance of your aircraft. Normal cruising is done with 65% power. Use the exact figures when performing a navigation training flight. For local training flights we will make use of the average fuel consumption figures mentioned in the aircraft SOP book.

A cruise level or altitude will be selected depending of distance to be flown, wind at altitude, weather (icing!), kind of exercise, ATC limitations, etc.

10.2 CRUISE PROCEDURE

SAA uses two types of cruise procedures: one for local training flights and one for navigation training flights.

- ***Cruise with a certain speed:***
  For local training flights it is common practice to select a certain cruise speed (e.g. 100 or 120 KIAS). Propeller(s) and throttle(s) are set to meet those requirements. For the cruising speed during local training flights refer to the SOP's of your aircraft.

- ***Cruise with a certain power setting:***
  For navigation training flights it is common practice to select a certain power setting according the cruise power setting schedules in your POH. When flying with a certain power setting, mixture(s) leaning is accomplished by using the EGT indicator. Lean mixture(s) to max performance setting. Best economy setting should only be used in extraordinary cases if you are low on fuel.

10.3 TRIMMING

Elevator
The elevator or pitch trim is used to remove pitch forces.

Rudder
The rudder trim when available is used to remove rudder forces and/or for multi engine aircrafts to reduce rudder forces during one engine out flight.

Trim Technique
The following trim procedure must be used when during stabilized cruise flight in still air with normal fuel distribution the control wheel and/or the ball is not centered.

- Preparation
  During multi engine operation check symmetric power condition.

- Procedure

Rudder trim: hold wings level with the control wheel, use the attitude scale for reference. Use rudder to correct any yaw. When the yaw rate is zero with the wings level, trim out any rudder pedal force. Elevator/stabilator trim: bring the aircraft in a straight and level attitude with the desired indicated airspeed. Trim out control wheel pitch forces using pitch trim.

11.0 TURNS

11.1 General

In principle all IFR procedures are based on rate-one turns (3° per second). Using the rule of thumb the bank angle for a rate-one turn is (10% of the TAS+ 7).

For training purposes a steeper bank angle may be asked by the instructor. Always bear in mind the higher amount of lift required to fly level with bank. Consequently in a turn the stalling speed will be higher than in level flight. In the lower speed range it may be necessary to increase the speed (power) when making a turn.

Look out before initiating a turn. Remember that there also may be aircraft flying on an IFR clearance, aircraft performing aerobatics, military aircraft etc. especially in areas with a dense traffic situation. Even when on an IFR flight plan, look out before initiating a turn. Remember that in VMC there also may be aircraft flying on a VFR flight plan especially in areas with a dense traffic situation like your training area.

11.2 Normal turns

- The bank angle for a normal turn is the angle required for a rate one turn.
- In the cruise speed range, no power adjustments are required to keep the speed constant during these turns.(speed will drop ± 5 kts)
- The maximum bank angle is 30°.

11.3 Climbing turns

- The normal bank angle is 15º or as required for rate one turn, whichever is less.
- The maximum bank angle for your aircraft is given in the SOP of your aircraft.

11.4 Descending turns

- The normal bank angle is the angle required for a rate one turn.
- The maximum bank angle is 30°.

11.5 Steep turns

Sometimes it may be necessary to make steeper turns than 30° AoB. The maximum angle during IFR operations is 45°. This is the steep-turn.
During this turn power has to be added (DA40: about 2”; DA42: about 10%; FNPT II: about 4”) to maintain a constant IAS.

In our Flying program a steep turn should be:

- With a constant bank angle of 45°,
- Coordinated,
- With a constant speed, equal to the entry speed
- With a constant altitude
- A 360° turn.

Steep turn:

	FLIGHT PHASE OR EVENT	STUDENT ACTION
1	**Before initiating the turn**	• Perform steep turn briefing • In VMC perform lookout. • Set heading bug on reference heading • Check the IAS
2	**Starting the turn**	• Roll coordinated to 45° AOB • Add power to keep IAS constant • Apply back-pressure to maintain altitude
3	**During the turn**	• Keep checking outside for other traffic • Check AOB, IAS and altitude • Make small corrections if necessary
4	**± 20° before reference heading**	• Start roll out
5	**During roll-out**	• Gradually release back pressure • Reduce power to cruise value

12.0 UNUSUAL ATTITUDE

An unusual attitude (UA) is any attitude which is different from the one the pilot intended the aircraft should be in. This does not mean the attitude is extreme, but it does mean almost certainly that the pilot is disorientated or has lost control of the aircraft in some way. If you do not take prompt recovery action, the situation could become serious.

The attitude indicator is reliable and is normally used for UA recoveries unless it indicates a failure.

The following summarizes the set drill used for the training of an UA.

- Perform the pre-stall checklist

- Your instructor will give you an UA.

- Recover the aircraft:

– **Speed:**	Low or decreasing	- full power
	High or increasing	- close the throttle(s)
– **Bank/Pitch:**	Check whether you have a high or low nose attitude.	

Nose high:	Roll aircraft towards the nearest horizon - limit bank angle to 60° and let the nose drop to the horizon, then roll to wings level on the AI.
Nose low:	Roll to wings level on the AI, then pitch to the level flight attitude.

- Check the performance instruments to confirm straight and level flight; return to straight and level scan.

- Post-recovery action: Check instruments; what went wrong? Depending on the situation consider To divert.

- Perform the after stall checklist.

If you are using the standby attitude indicator the drill is the same, although the scan is slightly different.

Conditions:
- During all exercises the aircraft shall be flown within the limits as presented in the pilot operating handbook POH.
- A minimum altitude is determined by WOH being 2500 ft AGL.

13.0 SLOW FLIGHT

A slow flight is being trained to get familiar with the behavior of the aircraft during low airspeeds, like in the circuit or on final. For the correct configuration and speed refer to your aircraft SOP book. Recovery of the slow flight is always with maximum power. Before commencing the slow flight the pre-stall checklist will be performed. The slow flight is finished with the completion of the after-stall checklist.

14.0 STALLS

14.1 GENERAL

The following stalls are trained during IFR training flights of WOH:
- Full stall in clean configuration
- Approach to the stall in clean configuration
- Approach to the stall in landing configuration
- Approach to the stall in the descending turn, approach configuration
- Approach to the stall in the climbing turn, take-off configuration

14.2 GENERAL ITEMS TO BE PERFORMED

The first steps to be performed are exactly the same for each mentioned stall. These items are:

- An exercise briefing by the PF.
- The pre-stall checklist

Perform the inside part according to the checklist
In case of VMC, perform the outside part (APOS). In case of IMC, the **P**osition and **S**ky clear items cannot be performed.
Start the stall exercise immediately following the last look-out turn without any delay.

14.3 THE RECOVERY

The recovery of the full stall has to be initiated at loss of altitude with the stick fully aft, or at the drop of the nose. To recover the stall a firm nose down movement is initially necessary together with the application of full power. Do not allow the nose to come up too soon, as a result of the application of power. When the stalled condition has stopped, gradually move the nose to the horizon and climb back to the original altitude.

The recovery of the approach to stall has to be initiated at the stall warning, at a predetermined IAS or at the onset of buffeting, whichever occurs first.
This predetermined IAS is found by adding 5 KIAS to the stall speed at the estimated mass and in the applicable configuration. Aim for minimum altitude loss, however a safe recovery prevails!

The actions to be taken to perform the stalls during single pilot operations are given below. When flying an aircraft without retractable gear or constant speed propeller those mentioned items must be ignored.

14.4 FULL STALL IN CLEAN CONFIGURATION:

Configuration:
- gear up,
- flaps up,
- throttle(s) idle,

	FLIGHT PHASE OR EVENT	STUDENT ACTION
1	**After completion of pre-stall checklist**	• Retard throttle(s) to idle.
2	**Speed below 100 KIAS**	• Do not trim anymore. • Check mixture(s) rich. • Select propeller control(s) full fine.
3	**First indication of stall**	• Call: “RECOVERY” • Lower attitude below horizon • Apply max power • Call: “MAX POWER CHECKED”
4	**When stalled condition has stopped**	• Bring nose gradually to horizon • Climb back to altitude
5	**At cruise speed**	• Call: “AFTER STALL CHECKLIST” • Read after stall checklist • Call: “AFTER STALL CHECKLIST COMPLETED”.

14.5 APPROACH TO STALL IN APPROACH CONFIGURATION

Configuration:
- gear down
- flaps at approach setting,
- power set at initial stall power

	FLIGHT PHASE OR EVENT	STUDENT ACTION
1	**After completion of pre-stall checklist**	• Retard throttle(s) to initial stall power
2	**Speed within white arc**	• Call: “FLAPS APPROACH” • Select flaps approach • Call: “FLAPS APPROACH SET” • *Call: “GEAR DOWN”* • *Select gear lever down*
3	***Three greens***	• *Call: “GEAR IS DOWN, THREE GREENS”*
4	**Speed below 100 KIAS**	• Do not trim anymore • Check mixture rich • Select propeller control(s) full fine.
5	**First indication of stall**	• Call: “RECOVERY” • Lowe the nose to break the stall • Apply max power • Call: “MAX POWER CHECKED” • Call: “FLAPS APPROACH CHECKED”
6	**When descent had stopped**	• Call: “GEAR UP” • Select gear lever up
7	**When gear lights are out**	• Call: "GEAR IS UP".
8	**Below max flap extended speed**	• Call: “FLAPS UP” • Select flaps to 0 degrees • call: “FLAPS UP SET”
9	**At cruise speed**	• Call: “AFTER STALL CHECKLIST” • Read after stall checklist • Call: “AFTER STALL CHECKLIST COMPLETED”

14.6 APPROACH TO STALL IN LANDING CONFIGURATION:

Configuration:

- gear down,
- full flaps
- power set at initial stall power

	FLIGHT PHASE OR EVENT	STUDENT ACTION
1	**After completion of pre-stall checklist**	• Retard throttle(s) to initial stall power
2	**Speed within white arc**	• Call: “FLAPS APPROACH” • Select flaps approach • Call: “FLAPS APPROACH SET” • *Call: “GEAR DOWN”* • Select gear lever down
3	**Three greens**	• Call: “GEAR IS DOWN, THREE GREENS” • Call: “FULL FLAPS ” • Select flaps to landing position • Call: “FLAPS FULL SET”
4	**Speed below 100 KIAS**	• Do not trim anymore • Check mixture(s) rich • Select propeller control(s) full fine.
5	**First Indication of approaching stall**	• Call: “RECOVERY” • Lower the nose to break the stall • Apply max power • Call: “MAX POWER CHECKED” • Call: “FLAPS APPROACH” • Select flaps approach • Call: “FLAPS APPROACH SET””
6	***When descent had stopped***	• *Call: “GEAR UP”* • Select gear lever up
7	**When gear lights are out**	• Call: "GEAR IS UP*"*
8	**Below max flap extended speed**	• Call: “FLAPS UP” • Select flaps to 0 degrees • Call: “FLAPS UP SET”
9	**At cruise speed**	• Call: “AFTER STALL CHECKLIST” • Read after stall checklist • Call: “AFTER STALL CHECKLIST COMPLETED”

14.7 APPROACH TO STALL IN DESCENDING TURN, APPROACH CONFIGURATION:

Configuration:

- gear down,
- flaps approach,
- power set at initial stall power
- 20° AoB

	FLIGHT PHASE OR EVENT	STUDENT ACTION
1	**After completion of pre-stall checklist**	• Retard throttle(s) to initial stall power
2	**Speed within white arc**	• Call: “FLAPS APPROACH” • Select flaps to approach • Call: “FLAPS APPROACH SET” • Call: “GEAR DOWN” • Select gear lever down
3	**Three greens**	• Call: “GEAR IS DOWN, THREE GREENS”
4	**Speed below 100 KIAS**	• Do not trim anymore • Check mixture(s) rich • Select propeller control(s) full fine • Start a descending turn with 20˚ AoB, max 500 FPM ROD
5	**First indication of approaching stall**	• call: “RECOVERY” • Lower the nose to break the stall • Apply max. power and simultaneous give a slightly nose down pressure • Roll out until wings level • Bring nose up at least until horizon • Check max power • Call: “MAX POWER CHECKED” • Check flaps approach • Call: “FLAPS TEN CHECKED”
6	**When descent had stopped**	• Call: “GEAR UP” • Select gear lever up
7	**When gear lights are out**	• Call: "GEAR IS UP".
8	**Below max flap extended speed**	• Call: “FLAPS UP” • Select flaps to 0 degrees • Call: “FLAPS UP SET”
9	**At cruise speed**	• Call: “AFTER STALL CHECKLIST” • Read after stall checklist • Call: “AFTER STALL CHECKLIST COMPLETED”

14.8 APPROACH TO STALL IN CLIMBING TURN, TAKE-OFF CONFIGURATION:

Configuration:
- gear up
- flaps up
- power set at climb power,
- bank rate one (max 15° AoB)

	FLIGHT PHASE OR EVENT	STUDENT ACTION
1	**After completion of pre-stall checklist**	• Start a climbing rate one turn and allow speed to decrease. • Call: "CLIMB POWER". • Select climb power • Call: "CLIMB POWER SET"
2	**Speed below 100 KIAS**	• Do not trim anymore
3	**First indication of stall**	• Call: “RECOVERY” • push the nose through the horizon • Apply max power • call: “MAX POWER CHECKED” • Roll out bank until wings level • Bring nose up at least until horizon
4	**At cruise level and speed**	• Call: “AFTER STALL CHECKLIST” • Read after stall checklist • Call: “AFTER STALL CHECKLIST COMPLETED”

15.0 DESCENT

15.1 PERFORMANCE SHEET:

If the POH of the aircraft contains tables and/or graphs concerning descent you can use those in the performance / fuel calculation. If no descent performance is mentioned in the POH or the associated conditions differ from the WOH descent procedure, we will use the following values for descent performance calculations: Use a descent rate of 500 ft/min for time/distance calculations and for the fuel consumption use the figures for cruise flight. Always use the most unfavorable conditions for fuel calculations, so for the STAR/approach use the longest published STAR/approach.

15.2 DESCENT PLANNING

Somewhere in the approach preparation the descent will/must be initiated.
During descent check regularly the distance to go and the altitude to be lost. Be at altitude in time!

To determine Top of Descent (TOD) we multiply every 1000 feet we have to descend by 2 minutes (500 FPM ROD). Then multiply the Ground Speed in miles per minute, by the time it takes to descent, to determine the required distance before the fix where we have to be level.(e.g. GS=120 kts, altitude difference is 4000 ft.. Time to descend: 4x2= 8 min. GS120 kts= 2NM/min => 8x2=16 NM)

15.3 DESCENT PROCEDURE:

During the climb the PF maintains the climb power by adjusting the throttles (correcting for the increased ambient pressure).

There are various types of descent. Those types are:

- **Cruise descent**:
  This type of descent is generally used, especially during navigation flights. The basic idea is, that the IAS used during the cruise part of the flight, is maintained during the descent and power is reduced to get a desired rate of descent (e.g. 500 ft/min). The advantage is straight forward; the speed is constant which is easy for flight planning; the time to a certain point can be determined in the cruise phase already.

- **High speed descent**
  This type of descent is used, when time is an important factor. The power is kept at cruise value and the speed is increased to start a descent. Compromise is chosen between an acceptable rate of descent, 1000 ft/min, and a flyable airspeed. If necessary some power may be reduced to increase the rate of descent. When using this type of descent, bear in mind the speed limit of the aircraft: V_{no}. Especially in IMC care should be taken not to exceed this speed, because it is not possible to see and avoid turbulent areas when flying in clouds. When already in turbulence or turbulence can be expected speed should be limited to V_a.

- **Idle power descent**
  The idle power descent will give the highest rate of descent of course. However rapid cooling of the engine may cause problems when power is needed again. Therefore this type of descent is not very common. Sometimes it will have to be used when simulating an emergency (for example a simulated engine failure).

Caution: mind cylinder temperature, especially during winter time

- **Emergency descent**
  This is the fastest way to loose altitude. It is, however an uncomfortable maneuver, not fit for normal procedures and it should only be used in case of an emergency. The configuration as given in the “EMERGENCY CHECKLIST” applies. Attention should be paid to the high rate of descent and the altitude required to level off. Always inform ATC about an intended “Emergency Descent” for training purpose.

DESCENT PROCEDURE

	FLIGHT PHASE or EVENT	STUDENT ACTION
1	**Cleared for descent**	If cleared to an altitude: • Call: “SET QNH….” • Set QNH in altimeter(s) • Crosscheck setting of altimeter(s) • Call: “….SET AND CROSSCHECKED” • Select carburetor heat on (when applicable) • Set descent power and start descending. • Adjust mixture(s) to maintain smooth operation • Call: “DESCENT AND APPROACH CHECKLIST”. • Read checklist • Call: “DESCENT AND APPROACHCHECKLIST COMPLETED”
3	**Cleared for approach and ½ scale deflection of GS or 1NM before FAF**	• Call: “FLAPS APPROACH”. • Select flaps approach • Call: “FLAPS APPROACH SET”.

Remark:
The approach checklist must be performed somewhere after the moment you are cleared to an altitude.
The setting of flaps approach may also be performed after completing the approach checklist.

16.0 APPROACH AND LANDING

Between the moment an aircraft is cleared for descent by ATC until it passes 50 ft. over the threshold the crew is faced with a congestion of actions to be taken and checks to be performed. This vital part of the flight has to be prepared thoroughly, which is in many cases already possible before take-off. A good flight preparation is of utmost importance. The PF will initiate all actions in due time and it is the responsibility of the PM to monitor the overall progress. It is important that the PF performs all actions out loud to let each crewmember know what he is doing. Keep each other in the loop!

The items mentioned below are written in a chronological order. It must be emphasized that certain specific circumstances might give a deviation from this chronological order.

16.1 APPROACH PREPARATION

For the approach preparation we make use of the five A’s and the expression “ANWB”, so you won’t forget anything. Highlights of these items are mentioned below.

- First A: ATIS
  When available listen out the ATIS.

- Second A: ATC
  When no ATIS information available, ask ATC for aerodrome information. State intentions.

- Third A: Avionics

  Make a logic sequence of beacons to be selected in both NAV-sets, the DME and the ADF. Also set and check the procedure in the GPS.

- NAV set(s): Always use the following steps when selecting frequency's:
  - Tune: the frequency
  - Identify: the selected frequency (morsecode)
  - Monitor: Couple nav. selector to the correct nav radio. Check position on the RMI. Set the Course selector to the desired course.

  Work in advance with the NAV-2 set. When on an intercept heading to the localizer or when guided with radar vectors to the localizer you should select the ILS frequency on NAV-1 and set localizer-course in the HSI. Use the NAV-2 set as long as possible for your horizontal orientation. Select the ILS frequency on NAV-2 when you are established on the localizer.

- ADF set(s): Always use the following steps when selecting frequency's:
  - Tune: the frequency
  - Identify: the selected frequency (morsecode)
  - Monitor: Check position of the adf needle. Check the setting of the compass scale in case of a fixed scale

  When there is a NDB available, but not integrated in the approach, use this NDB for your positional awareness.

- DME set(s): Mind the following steps when using the DME:
  - Check the setting of the DME unit. If it is for example on remote you must check which NAV set it is coupled to. It might also be in a DME hold position.
  - Identify the selected/coupled frequency

- GPS set(s): The settings of the GPS must be in such a way that optimum situational awareness is guaranteed.
  - First check if RAIM is available.
  - Load the approach procedure in the GPS

- Fourth A: Approach briefing

  A thorough approach briefing is of utmost importance. We use the expression "ANWB" for the approach briefing:
  - A stands for aircraft: brief any aircraft deficiencies of importance
  - N stands for Notam's: brief any applicable NOTAM's
  - W stands for weather: check if the given conditions are within IFR limits.
  - B stands for the briefing: The PF briefs the PM of the actions to be taken and uses the approach plate as a guideline for the briefing. The PM listens carefully and corrects the PF when items are missing or mistakes are made. The briefing must be given in a chronological order, beginning at the point where the aircraft is flying at that moment and ending in a missed approach or in vacating the runway.

- Fifth A: Approach checklist

  Perform the approach checklist when cleared to an altitude.

17.0 FINAL APPROACH

The standard configuration during the final approach is given in the SOP's for each aircraft/simulator. Another final approach configuration is possible and subject captain's discretion (SCD).

The PF will keep his hand on the throttle(s) from the moment of starting the final descent until after landing, unless other actions require differently.

During the approach the PF and PM monitor the flight path and check for visual clues outside. The "head up/head down" procedure. As soon as positive identification of ground, approach lights or runway can be made, the call "CONTACT" will be given. The PF then decides on his actions (e.g. reducing speed, altering configuration for landing).

Continuation of the approach below the descent limit is only allowed if the PF is convinced that the remainder of the approach and landing can be made with adequate visual reference. He should announce his decision by the command "CONTINUE" or "GO-AROUND" as applicable.

The call "CONTINUE" may only be given when:
• adequate outside visual reference has been obtained, and
• the aircraft is in a position from which a normal landing can be made.

When not established on final approach at 500 ft. HAA a go-around must be made. (established means: fully prepared, maximum descent rate of 1000 ft/min and within deviation limits mentioned in next paragraph). If you have the runway in sight at 500 ft HAA or above, the standard configuration for landing is with landing/full flaps unless other reasons prevent that.

If you get the runway in sight between 500 ft HAA and the missed approach point (MAPt) the selection of more than approach flaps is subject captain's discretion.

Not later than 500 ft above touch down elevation (precision approach) or 500 ft above the minimum descent altitude (non-precision approach) the propellers are set to high RPM and the Landing Checklist shall be completed.

17.1 MAXIMUM DEVIATION

It is always the captain's responsibility to take that action that ensures the safe flight / approach under all circumstances. Out of deviation limits is in principle a go around. The deviation limits are given in the table below:

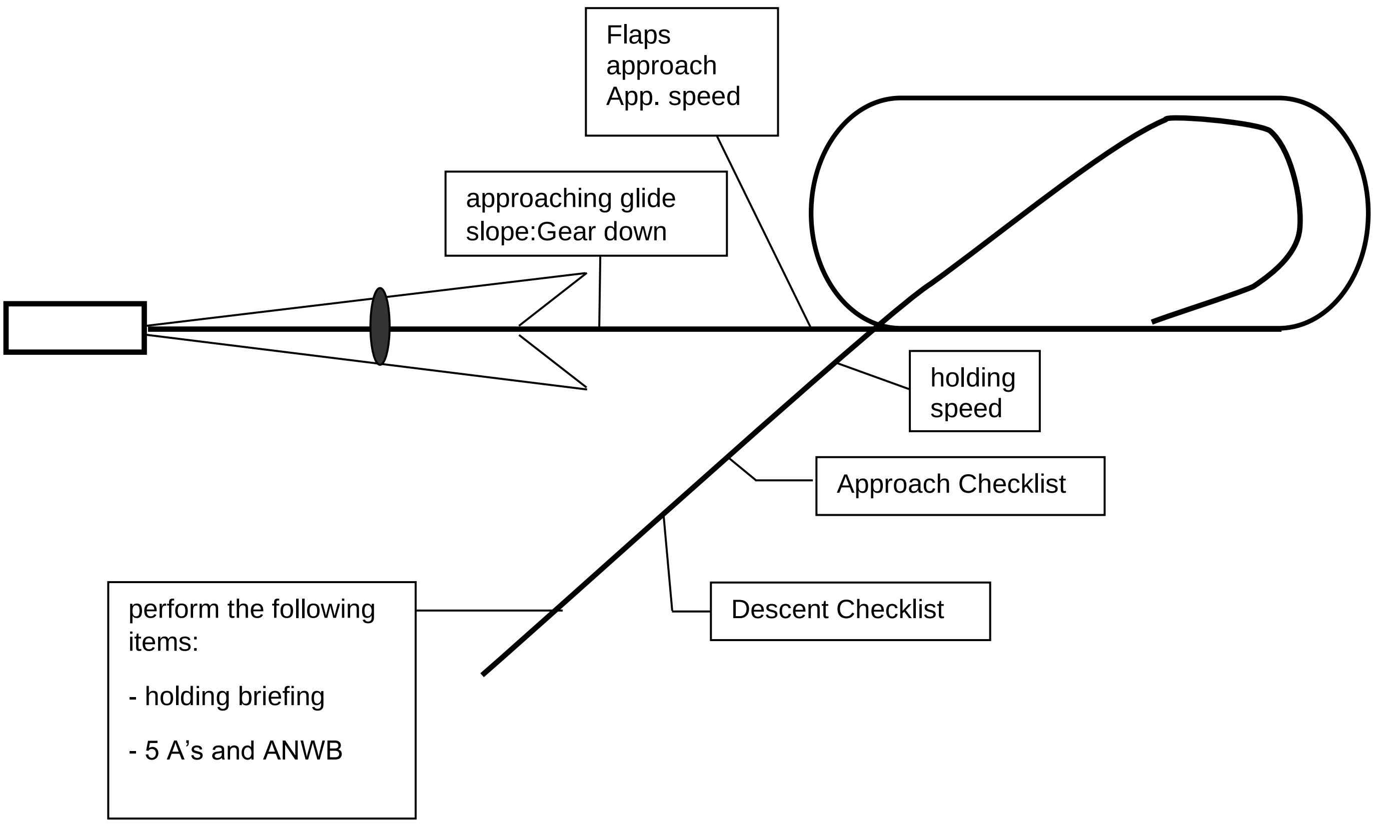
3-D	Azimuth	1/2 scale left or right
	Glide path	1/2 scale dot high or low
2-D	Azimuth	1/2 scale left or right
	Bearing	5° left or right

17.2 3-D APPROACH (CDFA)

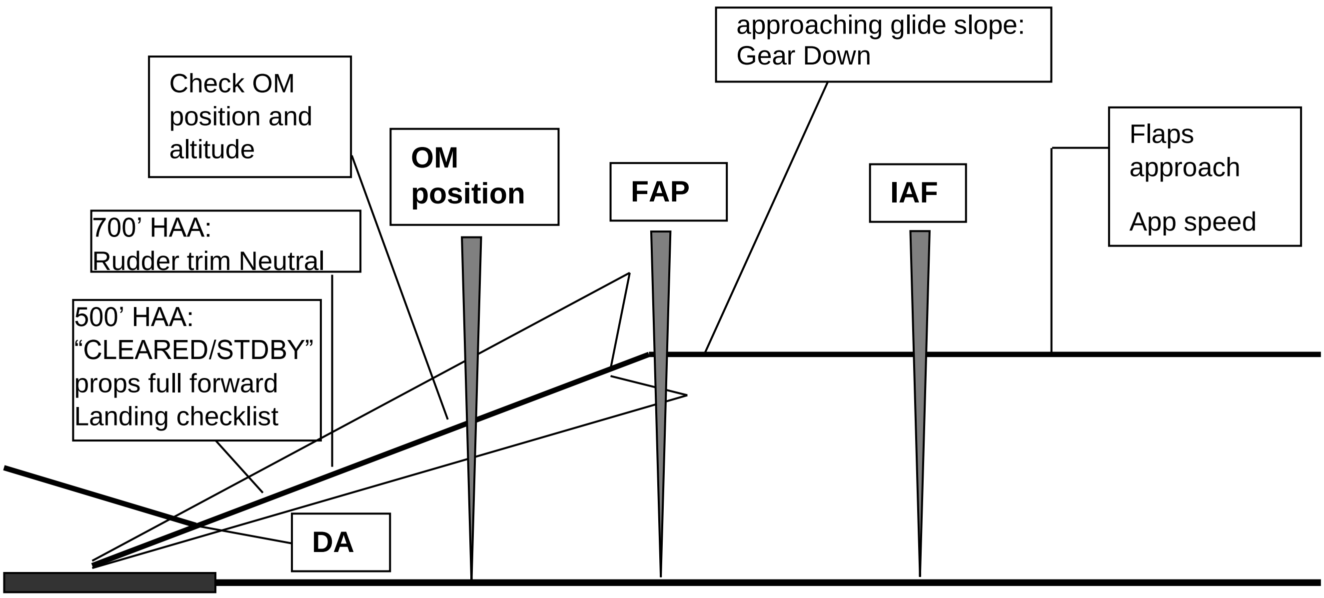
This procedure describes the ILS approach with use of flight director and autopilot. When not using this equipment those items must be ignored in the procedure.

	FLIGHT PHASE or EVENT	STUDENT ACTION
1	**On intercept heading**	• Arm approach mode • Call: “APPROACH ARMED”
2	**First positive inward movement of localizer.**	• Call: “LOCALIZER ALIVE” • Select ILS NAV 2 (if conditions permit)
3	**At localizer capture**	• Call: ”COUPLED”
4	**Stabilized on track.**	• Align heading bug
5	**First positive downward movement of glide slope.**	• Call: “GLIDE SLOPE ALIVE”
6	**At glide slope capture (approaching glide slope)**	• Call: ”GLIDE SLOPE” • Call: “GEAR DOWN” • Select gear lever down.
7	**Three greens.**	• Call: “GEAR IS DOWN, THREE GREENS”
8	**At outer marker or outer marker position (FIX)**	• Call: “OUTER MARKER”/ “…………” • Select markers OFF (only when not required for MAPt) • Check outer marker altitude • Respond: “ALTITUDE CHECKED”
9	**At 700 ft. HAA (only during N-1 operations)**	• Call: “RUDDER TRIM NEUTRAL” • Set/check rudder trim neutral • Call: “RUDDER TRIM NEUTRAL SET”.
10	**At 500 ft. HAA**	• Call: “500” • Call: “CLEARED or STANDBY” • Set propeller high RPM • Call: “PROPELLER HIGH RPM SET” • Call: “LANDING CHECKS” • perform landing checks • call: “LANDING CHECKS COMPLETED” • start head-up / head down procedure
11	**At 100 ft. above DA.**	• Call: “APPROACHING MINIMUMS". • head-up / head down status
12	**Visual outside clues.**	• Call: “CONTACT”, or “RUNWAY” or “APPROACH LIGHTS” • head-up status
13	**Above 150 HAA**	• Switch off autopilot with the a/p disconnect button • Call: “AUTOPILOT OFF”
14A	**At DA, or above and cleared**	• Call: “CONTINUE”
14B	**At DA, when no visual clues.**	• Activate G/A mode • Set G/A power • Call: “GO AROUND” • Continue with go around SOP

17.3 INSTRUMENT APPROACH PROFILE (PREPARATION)



17.4 3-D APPROACH (WITHOUT FLIGHT DIRECTOR / AUTOPILOT)



17.5 2-D APPROACH

A 2-D approach shall be flown on raw data. AP/FD shall be disengaged at the latest on intercepting final track for the approach.
The procedure below describes a 2-D approach with intermediate steps, a MDA and MAPt.
When a 2-D approach is flown to DA (CDFA), do not level off at DA but perform the Go Around SOP when not visual.

	FLIGHT PHASE or EVENT	STUDENT ACTION
1	**If applicable; First positive inward movement of course deviation indicator.**	• Call: "NEEDLE ALIVE"
2	**Stabilized on track.**	• Align heading bug
3	**Approaching descent point.**	• Call: "GEAR DOWN". • Select gear lever down.
4	**Three greens.**	• Call: "GEAR IS DOWN, THREE GREENS"
5	**Approaching step.**	• Level off until reaching step down fix.
6	**At step down fix**.	• Resume descent
7	**At 700 ft. HAA (only during N-1 operations)**	• Call: "RUDDER TRIM NEUTRAL" • Set/check rudder trim neutral • Call: "RUDDER TRIM NEUTRAL SET".
8	**At 500 ft. above MDA**	• Call: "FIVE HUNDRED" • Call: "CLEARED or STANDBY" • Set propeller high RPM • Call: "PROPELLER HIGH RPM SET" • Call: "LANDING CHECKS" • perform landing checks • call: "LANDING CHECKS COMPLETED" • start head-up / head down procedure
9	**At 100 ft. above MDA.**	• Call: "APPROACHING MINIMUMS".
10	**At MDA.**	• Level off until MAPt. • head-up status
11	**Visual outside clues.**	• Call: "CONTACT", or "RUNWAY" or "APPROACH LIGHTS"
12	**When visual and cleared**	• Call: "CONTINUE"
13	**At MAPt, when no visual clues.**	• Set G/A power • Call: "GO AROUND" • Continue with go around SOP

17.6 AFTER BECOMING VISUAL

	FLIGHT PHASE or EVENT	STUDENT ACTION
1	**In an instrument approach below 500'HAA selection of more than approach FLAPS is not mandatory but SCD. (be established!). If so decided:**	• Call: "FLAPS LANDING" • Select flaps landing.
2	**Flaps landing set indicated**	• Call: "FLAPS LANDING SET".

17.7 CIRCLE TO LAND APPROACH

A circling approach is a visual maneuver after completing an instrument approach procedure. It is used to bring an aircraft into position for landing on a runway which is not suitably located for a straight in approach.

Before commencing a circling approach, examine the approach charts carefully. Pay special attention to the location of high ground and obstacles.

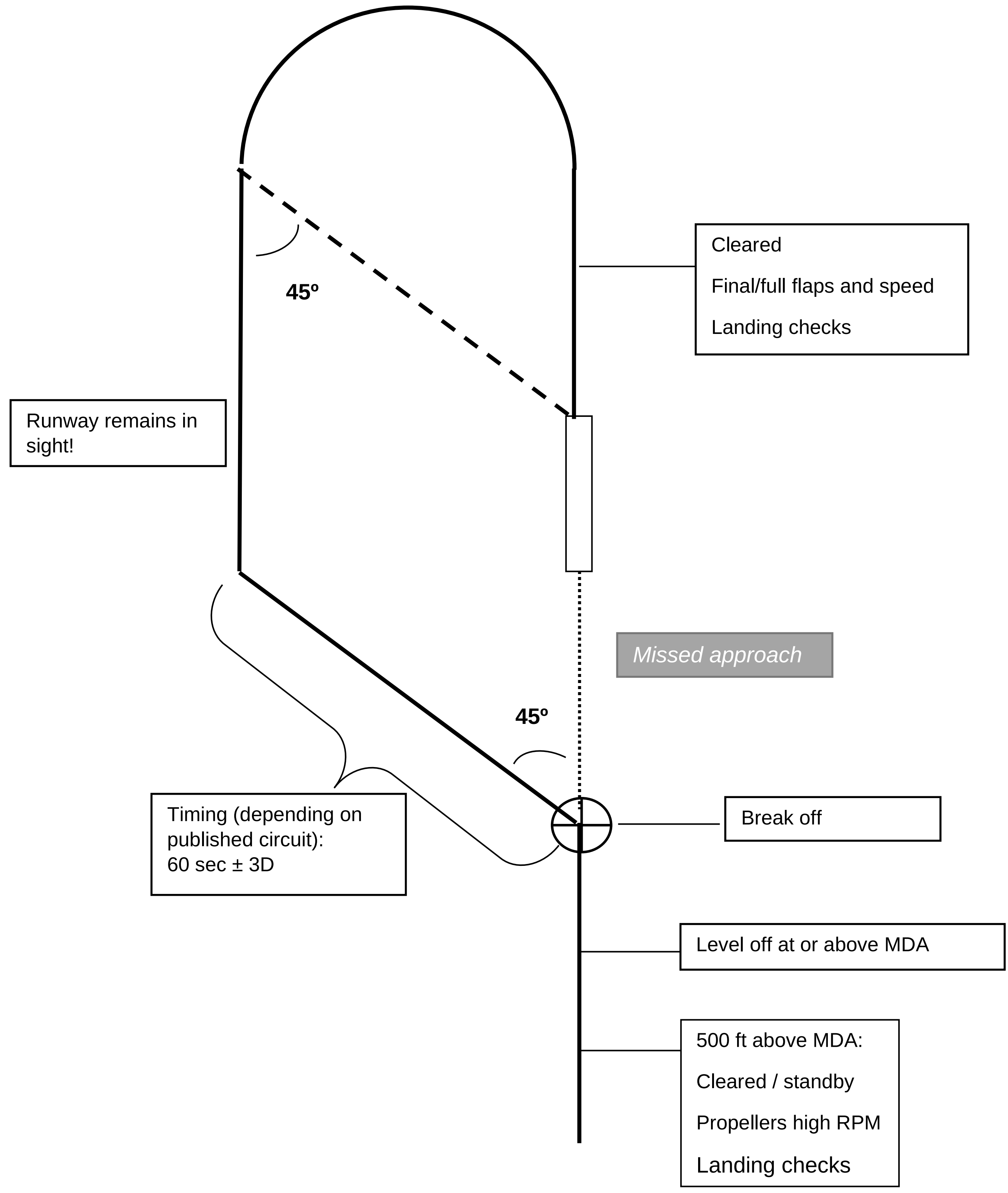
Remember the requirement that during a circling procedure both circling limits and visual contact must be maintained at all times. If any of those items is lost, a missed approach must be initiated conform the applicable procedures (ref. to AIP and Jeppesen).

Depending on the circumstances (clouds, visibility) the circling can be performed at any altitude between MDA and 1500'HAA as long as you maintain visual contact throughout the circling.

CIRCLE TO LAND APPROACH:

	FLIGHT PHASE or EVENT	STUDENT ACTION
1	**At 500 ft above MDA**	• Call: "FIVE HUNDRED" • Respond: "CLEARED or STANDBY" • Set propeller high RPM • Call: "PROPELLER HIGH RPM SET" • Call: "LANDING CHECKS" • Perform landing checks • Call: "LANDING CHECKS COMPLETED"
2	**At break off altitude (training: minimum 500 ft HAA)**	• Call: "MDA".
3	**On downwind leg**	• Fly circle to land speed
6	**When established on final leg and cleared**	• • Call: "CLEARED" • Call: "FLAPS LANDING". • Select full flaps
7	**Landing flaps indicated**	• Call: "FLAPS LANDING SET" • • Fly final speed • • Call: "LANDING CHECKS" • Perform landing checks • Call: "LANDING CHECKS COMPLETED"

CIRCLE TO LAND APPROACH:



17.8 HIGH SPEED APPROACH

When flying a higher than normal speed on the approach, the selection of Flaps and Gear may/must be postponed due to flap and gear speed limitations. Selection of those items will be done after passing the outer marker/fix. This procedure could be flown when:

- ATC requires a target speed which is higher than the normal approach speed
- required by local noise regulations.
- training high speed approaches.

18.0 GO AROUND AND REJECTED LANDING (WAVE-OFF)

The rejected landing is similar to the go-around procedure except that the maneuver begins with the power levers near or at idle and at altitudes below 50 ft (during round off for landing). The rejected landing is often called a “Wave-off” and will be initiated during training session after the call by the instructor: “RUNWAY OBSTRUCTED, GO AROUND”. Any other moment of breaking of an approach is called a go-around. The procedure with use of autopilot is given in the schedule below.

	FLIGHT PHASE or EVENT	STUDENT ACTION
1	**When reaching DA/MAPt and no visual reference or when too large deviations on approach, when not convenient etc.**	• Call: “GO AROUND” • Push G/A button on throttle • Set take-off power and rotate to initial climb attitude • Check power. • Call: “POWER CHECKED”
2	**Retract flaps and gear conform flap retraction schedule**	• Call: “FLAPS …..” • Select flaps lever one stage up. When full flaps are set • Call: “FLAPS ….. SET”.
3	**Retract gear above 50 ft HAA and positive rate of climb.**	• Call: “GEAR UP” • Select gear lever up.
4	**When gear lights are out.**	• Call: "GEAR IS UP"
Proceed with item 7 of the normal take-off SOP		

19.0 TOUCH AND GO

	FLIGHT PHASE or EVENT	STUDENT ACTION
1	**Rolling on the runway for touch and go.**	• Call: "FLAPS T/O". • Select flap lever to T/O position. • Reset elevator trim.
2	**Flaps up indicated.**	• Call: "FLAPS T/O SET" • Advance throttle(s) smoothly to T/O power • Check T/O Power • Call: "T/O POWER CHECKED"
3	**At V_r**	• Call: "ROTATE". • Smoothly rotate at ±. 3°/sec. to the initial climb attitude
Proceed with item 5 of the normal take-off SOP		

20.0 AFTER LANDING

	FLIGHT PHASE or EVENT	STUDENT ACTION
1	**Reaching taxi speed.**	• Call: "TAXI SPEED".
2	**Active runway vacated and after coming to a full stop**	• Call: "AFTER LANDING CHECKLIST". • Read taxi-in checklist.
3	**After landing checklist completed.**	• Call: "AFTER LANDING CHECKLIST COMPLETED".
4	**After parking.**	• Call: "AFTER PARKING CHECKLIST". • Read after parking checklist.
5	**After parking checklist completed.**	• Call: "AFTER PARKING CHECKLIST COMPLETED".

21.0 Basic Failure Management (BFM)

To help pilots cope with situations that are beyond normal flight, a standardized schedule for dealing with abnormal flight conditions has been developed. This is called Basic Failure Management (BFM). BFM, when used correctly, ensures that the chance of mistakes is diminished, and that when mistakes do occur the pilots have the chance to correct this in an early stage. The reason for this is that BFM provides clearness in the cockpit about responsibilities and the sequence in which problems are dealt with.

When solving a single failure, follow the BFM. When solving multiple failures, decide first which failure has priority and follow the BFM until step 3 (memory items). Then follow the BFM from the beginning for the other failure and continue with step 3 (emergency checklist) for both failures.

BFM

1. **Maintain aircraft control.**
   Control pitch/power/trim. The main task of the pilot is flying the aircraft safely. So set attitude and power to maintain current flightpath or if necessary adjust heading and altitude to steer away from weather / airspace.

2. **Assess the situation.**
   Investigate the problem and state the facts. Use all resources to positively identify the failure, check each parameter associated with that system. Look at other systems that may have either caused or may be affected by what is presumed to be the primary failure. Use other resources such as crew members, passengers, ATC
   - What is the primary failure?
   - What evidence do I have to back this up?
   - What are the secondary failures?
   - What is the impact?

3. **Take proper action.**
   Perform memory items, calling out all actions. When time permits, perform the emergency checklist.

4. **Land as soon as the circumstances permit.**
   Determine how to continue the flight.
   A. Collect information: - Be alert on new failures,
   - check fuel quantity,
   - weather,
   - approach aids,
   - Landing distance available
   B. Make your plan: - Return
   - Continue
   - Divert
   - Hold.
   C. Inform: ATC