

TURN YOURSELF AROUND - PROCEDURE TURNS

& VFR TRAFFIC PATTERNS

Procedure Turns

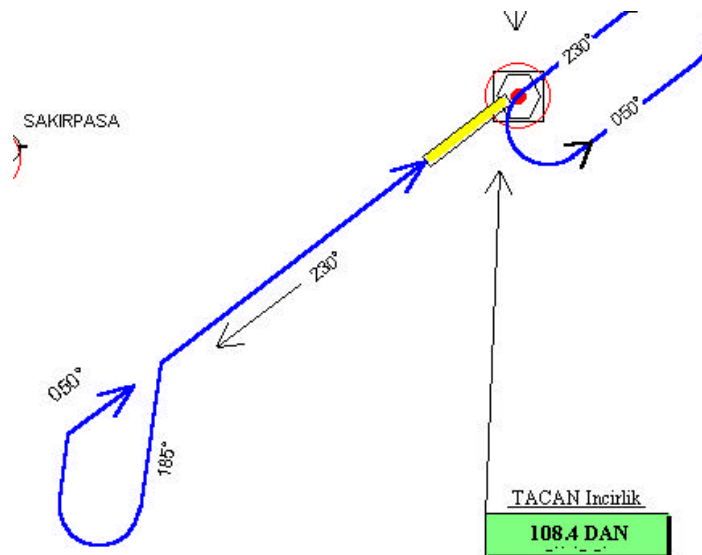
Back in my days in flight school, we thought that we were red hot. We were convinced that the U.S. Air Force should modify the wings they issued to include a "J" on the shield. That would identify us as JET pilots. Wow, the arrogance of youth.

When we arrived at a destination, we used a high altitude jet penetration to descend and align ourselves with final approach. Since we were JET pilots, we referred to this first type approach, shown below, as a Greasy Engine Letdown -- an approach for those low altitude weenies that had oil and grease streaking their engine cowling(s).

1) 45-180-45 (Greasy Engine Letdown) Procedure Turn

The procedure turn is generally on the same side as the holding side (as depicted in this example). Outbound (230 degrees) is the opposite of the landing direction. At a given point, or a timed distance from the navigation aid, execute a 45-degree turn. Here, it is a left turn to 185 degrees. After the specified period of time (usually around one and one-half minutes) execute a 180-degree turn -- here, back to 005 degrees. In this example, it is a right 180-degree turn because the turn is always "away" from or puts you further from the runway. As the VOR (VHF Omni Range) localizer or NDB (Non Directional Beacon) needle nears final approach heading, turn right 45 degrees and intercept final approach. In the example, turn to the final approach heading of 050 degrees.

If the procedure turn were on the opposite side, the direction of the turns would be reversed. Keep in mind that in either case, after the initial 45-degree turn, the 180-degree turn is always "away" from the runway.

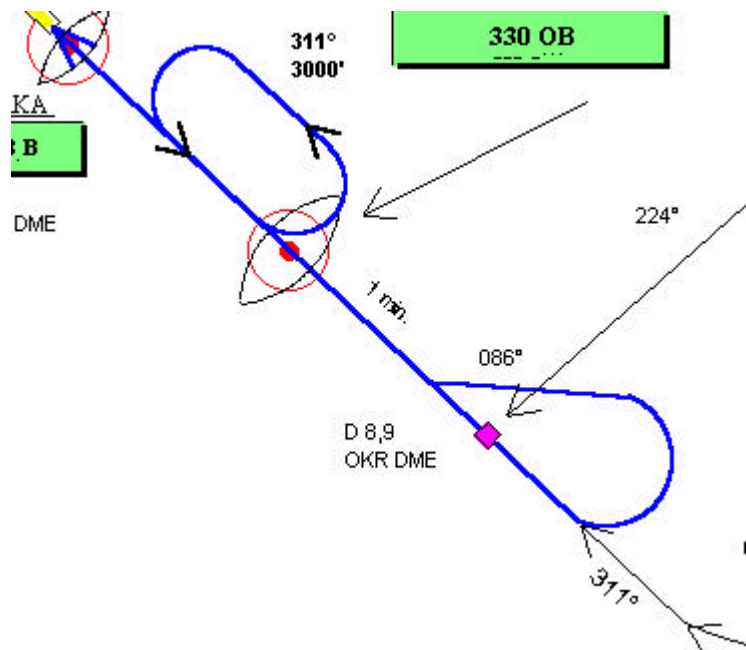


2) Teardrop Procedure Turn

This is similar to the 45-180-45 procedure turn, except that it uses only two turns. Again, the procedure turn is on the same side as the holding pattern. Outbound on a heading of 131 degrees, fly a specified time (in this case 1 minute). Turn left 45 degrees and hold for a specified time. More than likely, the turn will be less than this example. I'd expect to see 20 to 30 degrees. If no time is specified, one and one-half minutes should suffice.

After the time, begin a right turn back to final approach heading. As the VOR localizer or NDB (Non Directional Beacon) needle nears final approach heading, roll out and intercept final approach.

If the procedure turn were on the opposite side, the direction of the turns would be reversed.



3) 90 / 270 Procedure Turn

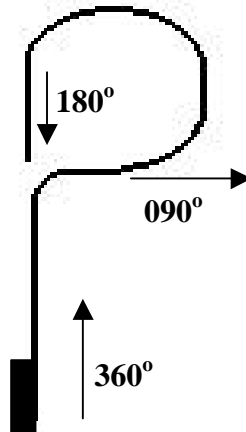
The procedure turns described above work well when you have a specific navigation aid to use. Flying VFR (Visual Flight Rules) into uncontrolled airports can pose different problems.

In real life, you would enter and fly a typical VFR traffic pattern. And, except for low visibility situations, you probably can maintain visual contact with the runway. The flight simulator is a different animal. At 1,000 feet AGL (Above Ground Level), I often lose sight of the runway--especially if it's a grass or dirt strip.

In this situation, I've found that the 90 / 270 turn works well. Line up with the runway and overfly it on a heading opposite of the landing runway. In this example, the runway is 18 / 36 and we will land on runway 18. Fly northbound (360) for two minutes past the end of the runway. Turn 90 degrees to the right to a heading of 090. Roll out of that turn and immediately roll into a left turn. Hold this turn for 270 degrees and roll out on a heading of 180.

In a no wind condition, and assuming you hold a constant turn **rate** throughout both turns, you will roll out of the turn at same spot over the ground where you started the turn -- and be headed the opposite direction.

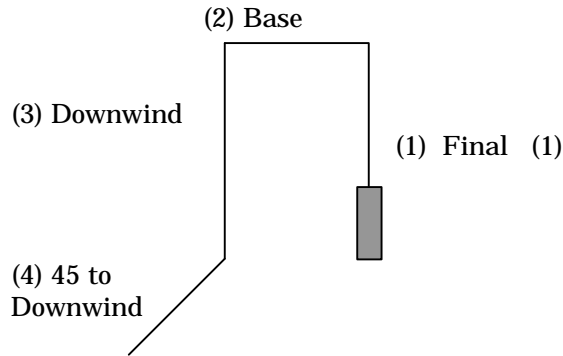
Flying two minutes past the runway should put you on a 4 mile final when you roll out (assuming 120 knots, 2 miles per minute). This procedure turn works in those situations where there is no navigation aid to help you identify the runway and final approach.



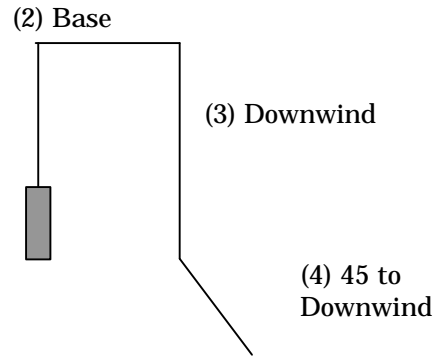
VFR Traffic Patterns

The direction of traffic given (right or left) is your relation to the runway. If told to enter a "right pattern for runway xxx" -- your turns in the pattern will be right hand turns.

Right Hand Pattern



Left Hand Pattern



Example: Right Traffic Pattern to Land Runway 33

Enter Pattern Headings Below	Right Traffic	
330	Runway Hdg	Final Approach Runway Hdg (1)
240	(1) MINUS 90 degrees	Base Leg (2)
150	Runway Reciprocal	Downwind (3)
195	(2) MINUS 45 degrees	45 to Downwind (4)

