

## Instructions for the use of 5300-13 Taxiway Design Tool for Multiple Turns

The Excel spreadsheet, “5300-13 Taxiway Design Tool for Multiple Turns” may be used to determine the radii necessary for taxiway intersections based on AC 150/5300-13A Change 1. The fuselage angles<sup>1</sup> at critical points, the length of the straight section between turns (if not entered by the user), the total length of the required taper leading out of a turn from the point of intersection (P.I.) (L-1 + L-2 + L-3 in AC 150/5300-13) and the length of the taper beyond the point of tangency (P.T.) are calculated.

1. Use the dropdown list in cell B2 to choose the TDG. The Cockpit to Main Gear Distance (CMG), Main Gear Width (MGW), Taxiway Edge Safety Margin (TESM), and Taxiway Width (W) are shown in cells B3 – B7.
2. Enter the (first) intersection angle (delta) in cell B8. Turns of very obtuse deltas may be entered as two turns with a zero length straight section between them. Deltas of greater than 180 degrees must be handled in this manner. See step 3 below.
3. If calculating for two closely spaced turns, enter either the distance from P.I. to P.I. in cell B9 or the known length of the straight section in cell B11, and the second intersection angle in cell B12. If turns are in opposite directions, enter either delta as negative.
4. In column A, starting in row 23, enter any range of turn radii desired, incremented as desired, down to row 155. Enter corresponding radii of the second turn in column B. If the two radii are equal, it is not necessary to enter R-2 in column B. Turn radii are assumed to be equal if no radius is specified in column B. Since most taxiways are two-way, this will be most of the time. The ability to specify R-2 is useful in designing high speed exits.
5. For a single turn, read the maximum fuselage angle in column O. For two turns, read the maximum fuselage angle in column AC.
6. Read the taper length required beyond the P.T. in column AI.
7. Read the total of L-1 + L-2 + L-3 in column AN.

Example: To calculate the required radius for two closely spaced TDG-6 turns of equal radius, the first 45 degrees and the second 90 degrees, and P.I. to P.I. = 500', enter the two deltas in cells B8 and B12, the P.I. to P.I. distance in cell B9, and a range of radii in column A. Reading down column AC shows a minimum radius of 117'.

<sup>1</sup> When the nose gear is aft of the cockpit, the nose gear steering angle will be slightly less than the fuselage angle. Use the fuselage angle as a slightly conservative design factor.

If you note any inconsistencies in the spreadsheet or have suggestions for improvement, please contact: [Khalil.Kodsi@faa.gov](mailto:Khalil.Kodsi@faa.gov)

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