

# Retract Angles

Dave Platt did a column for RCM called "Scale In Hand".

In one memorable installment, Dave laid out a simple technique for getting landing gear rake right each and every time.

Let's say you're building a warbird with wheels that retract inward and rake backward (ala P-47). Let's say the angle of backward rake in the retracted position is 21 degrees relative to the wing spar. Let's say the angle of *forward* rake with the gear extended is 8 degrees forward from *vertical*. With me (and Dave) so far?

With these two numbers, you can build a retract mount that will work perfectly each and every time:

1. Add the two rake angles and divide by 2:  
 $21 + 8 = 29$ .  $29 / 2 = 14.5$  degrees.

2. Now you must build the retract mount so that the retract unit is angled 14.5 degrees backward in the plan view, and the unit is tilted 14.5 degrees *forward* in the side view.

3. That's okay so far, but now neither angle is correct. So now, you BEND the retract strut backward by *one half the DIFFERENCE* between the two rake angles:

$21 - 8 = 13$ .  $13 / 2 = 6.5$ .

So you're going to bend the gear strut backward by 6.5 degrees.

Let's check our math: With the landing gear down and locked, the forward rake will be 14.5 degrees (angle the unit is tilted in the side view), MINUS the 6.5 degrees of bend in the strut, or 8 degrees.

With the gear retracted, the aft rake will be 14.5 degrees (angle the unit is rotated in the planform view) PLUS the 6.5 degree bend in the strut, or 21 degrees.

