

**Solo Flight: Taxiing****Fly This Lesson Now**

—by Rod Machado

"Before you can learn to run, you must learn to walk." That's what my grandfather always told me. He also told me that I was adopted. When I sighed in disbelief, he said, "Yeah, that's right, adopted, but they brought you back. Ha!" There's my grandfather's sense of humor for you.

If my grandfather were a flight instructor (he's not), I'm sure he would have said, "Before you can learn to fly, you must learn to taxi." He would have been right, too. Here are a few taxi tips you should be familiar with before you go charging off into the wild blue yonder.

**Taxi Thoughts**

Airplanes are often graceful birds in the air. On the ground, however, they're clumsy—kind of like an albatross. To put it simply, they aren't mean to spend a lot of time on the ground. Therefore, engineers don't design them with all the creature comforts you'd expect of a ground-bound vehicle. You shouldn't expect to find power steering in your Cessna 172, for instance. You will, however, find pedals on the floor of the cockpit in a real airplane. These are how you'll steer the airplane during taxi.

Taxiing is rather easy. If your system is equipped with rudder pedals, simply push one or the other to turn the airplane. (If you've got rudder action built into your joystick, just twist the joystick, and it will have the same effect as pedals. Hopefully, if you twist your joystick, it will be the twistable type. Don't twist it if there is no control feature associated with the twist, otherwise your joystick will come off in your hands which will make it a "no-joy stick." Assuming that your joystick does not twist, use the **0** key on your numeric keypad for left rudder and the keypad's **ENTER** key for right rudder.) Pushing a pedal deflects the airplane's nose gear in the same direction, causing the airplane to turn. For example, pushing the right pedal makes the airplane turn to the right. Once airborne, the airplane's nose gear extends into a position that prevents it from turning. When this occurs, pushing a rudder pedal deflects the rudder and not the nose gear.

If you don't have rudder pedals, then life is much simpler for you. You steer by deflecting the joystick. The airplane turns in the direction the joystick is deflected. It doesn't get any easier than that.

A word of caution: You want to avoid taxiing fast. The faster you taxi, the easier it is to have the airplane do something you don't want it to do. Tricycle-gear airplanes, for example, are unstable when they have to stop quickly. Anyone who has ever ridden a child's tricycle knows this. One quick stop or too sharp a turn causes the tricycle to topple over. It's the same with airplanes. As a general rule, you don't want to taxi faster than you can walk. Of course, if everyone walked with the stride of Wilt Chamberlain, the pilots would have more patience during taxiing. Try to taxi slowly.

You do this by using only enough power to start the airplane moving and then reducing it to about 1,000 rpm. If the airplane starts moving too quickly, then reduce the power to idle and apply the brakes. Slow the airplane down to an acceptable taxi speed, and continue as before.

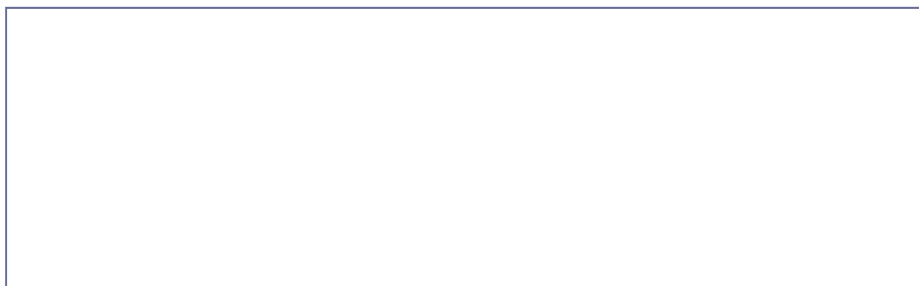
Taxiing the airplane is the easy part of this process. The difficult part is figuring out how to get where you want to go on the airport. You can't just head out across the airport unless you know something about taxiway and runway markings. If you're at an airport with an operating control tower, then you need to contact ground control for permission to taxi.

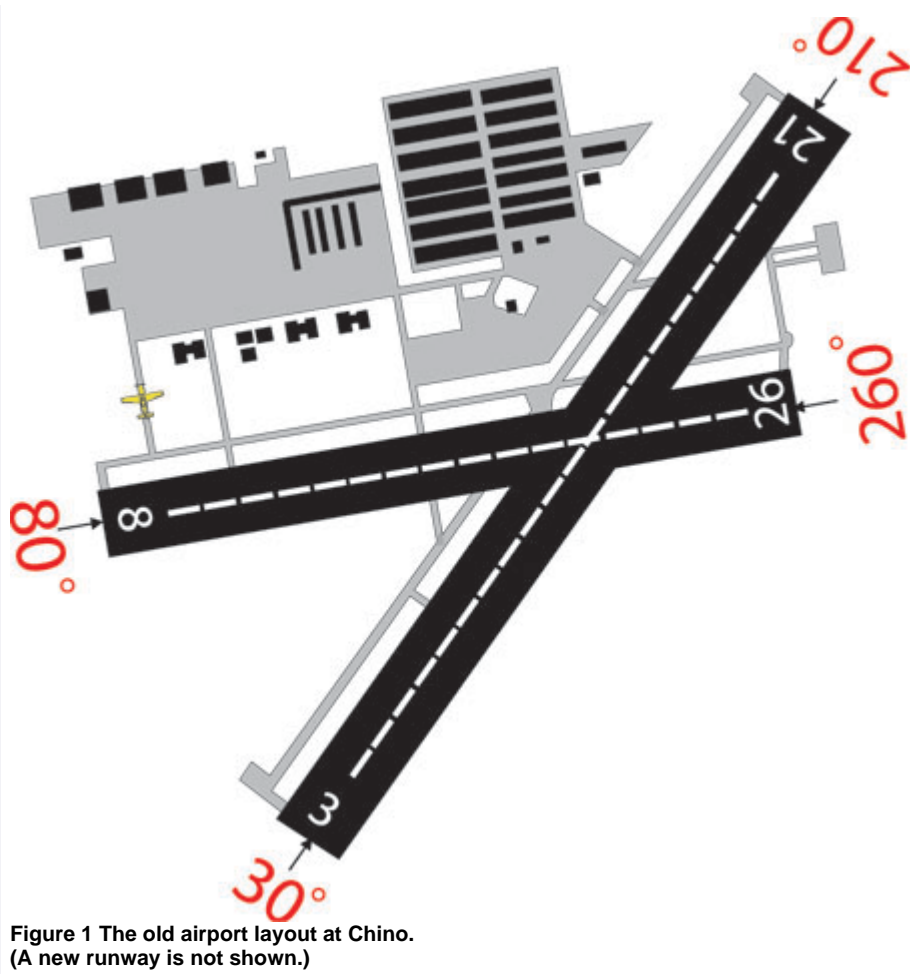
**Airport Markings**

Have you ever wondered what all those small trucks at airports—the ones with the flashing yellow lights—do? I thought I knew. For a long time, I was convinced they brought sandwiches to the student pilots who became lost on the airfield. After all, even students need sustenance while attempting to navigate from taxiway to runway to parking spot.

An airport's signage and markings are one situation in which consistency makes for confidence, and the FAA lends a helping airfoil by specifying in great detail how airport runways, taxiways, and other aircraft movement areas are to be laid out, marked, and lit. While it's not quite true that if you've seen one airport you've seen 'em all, there is a method to the apparent madness. Just like a Buck Rogers secret decoder ring, you have to decipher what's in front of you.

Let's take a look at Chino, California, shown in Figure 1.





The airport is graced with two runways capable of handling takeoffs and landings in four different directions (two directions on each of the two runways, for the geographically challenged).

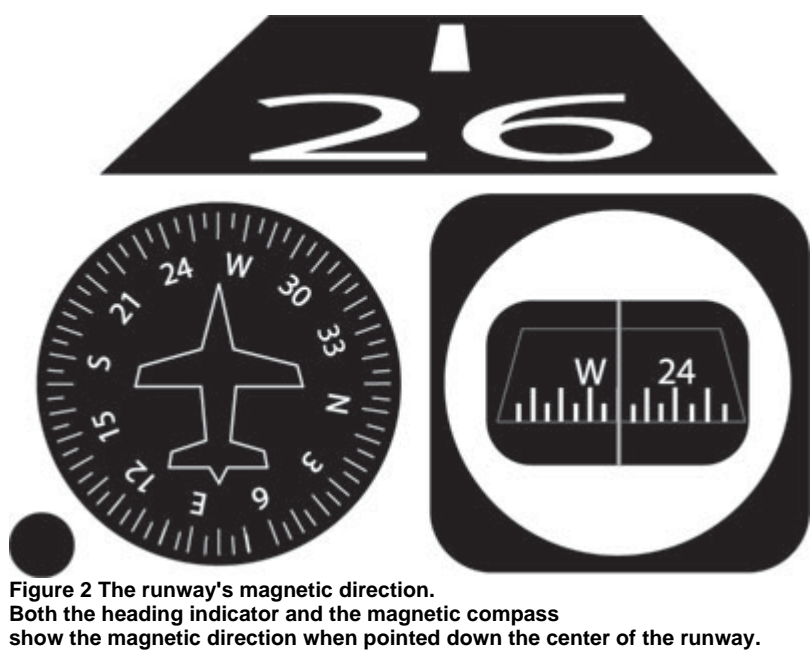
Since Chino is a tower airport and since controllers get upset when you land on a different runway from the one they had in mind, it's helpful to know that runways come with numbers, which are always large and painted in white. Runway numbers and their markings help distinguish them from the airport's nonlanding surfaces. Chino's runways are numbered 8, 26, 21, and 3.

You think they just make those numbers up, don't you? I had a student who thought runway numbers were based on some sort of speed limit or seismograph record. Uh huh. The numbers represent the first two digits of the runway's actual three-digit magnetic direction. Essentially, a runway's numbers are its direction, rounded off to the nearest 10 degrees. A runway oriented at 211 degrees becomes Runway 21 (pronounced "runway two-one" when speaking to controllers and other aviation-savvy people). A runway pointed 076 degrees becomes Runway 8 (rounding up).

There are two sides to almost every issue and two ends to every runway. With rare exceptions (usually having to do with terrain), you can theoretically land or take off from either end. This means each piece of runway pavement has numbers on each end. Those who are way ahead of me will realize these numbers, when expressed as three-digit figures, differ by a value of 180. Makes sense, since the two directions are 180 degrees apart.

All runway angles are oriented to the magnetic North Pole, where the magnetic compass points, and not the true North Pole, where Santa Claus (a pilot) lives. When your airplane is pointed down any runway, the airplane's magnetic compass should approximately indicate that runway's direction. Figure 2 shows what the compass and the directional gyro might look like when aligned with Runway 26 at Chino.





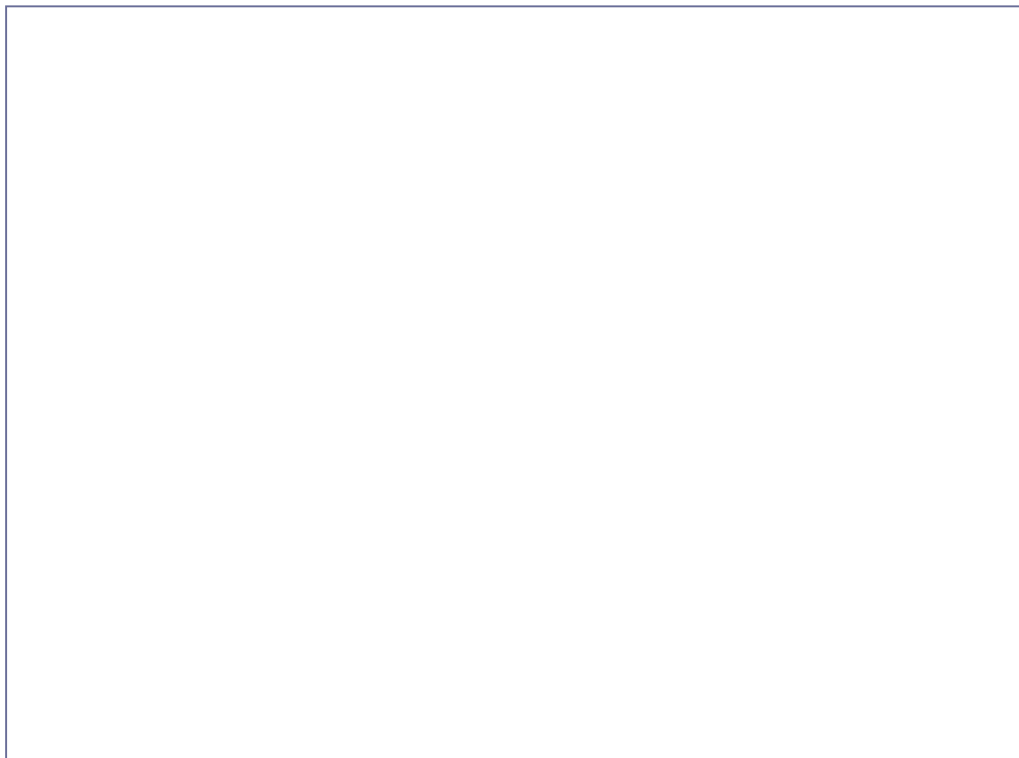
Remember that when operating at an airport: wind direction, landing direction, and any headings ATC asks you to fly are all based on magnetic direction.

## Runway Lighting

Painted white, runway markings are easy to identify during the day, but what about at night? Don't look for fluorescent orange any time soon. The airport has an image to maintain. Besides, the airport would become a magnet for rock stars and flower-painted Volkswagen buses if those colors were used.

The answer at night is light. As the sun sinks slowly into the west, the airport often lights up like one of those amusement park parades. All kinds and colors of lights, some flashing and some steady, are there to amuse and confuse you. Think of it as color-coded hints, and you'll be on the right track.

White lights, shown in Figure 3, border both sides of the runway.



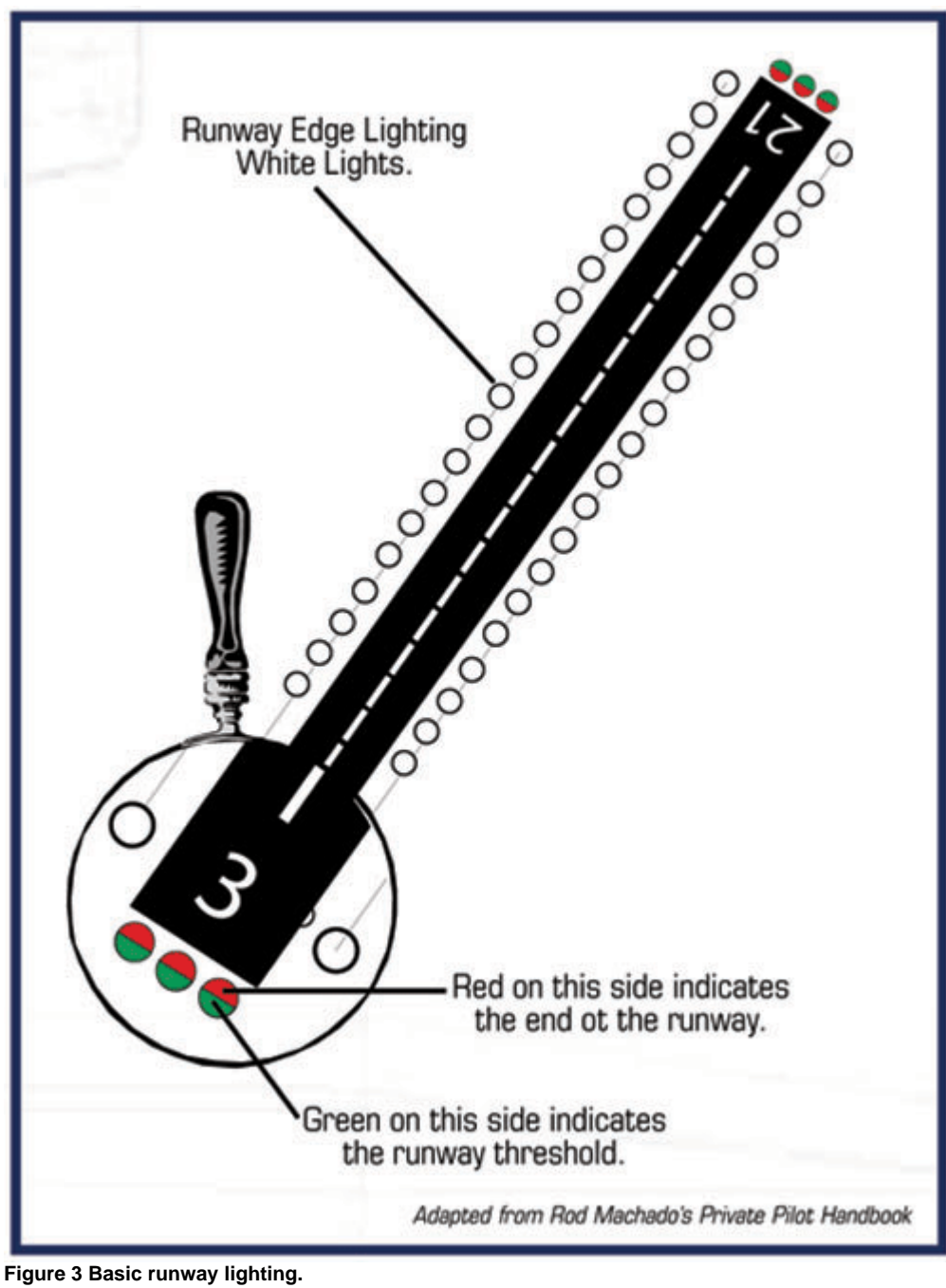


Figure 3 Basic runway lighting.

Called runway edge lighting, these lights are spaced 200 feet apart. Controllers turn these lights on between sunset and sunrise or when visibility is poor.

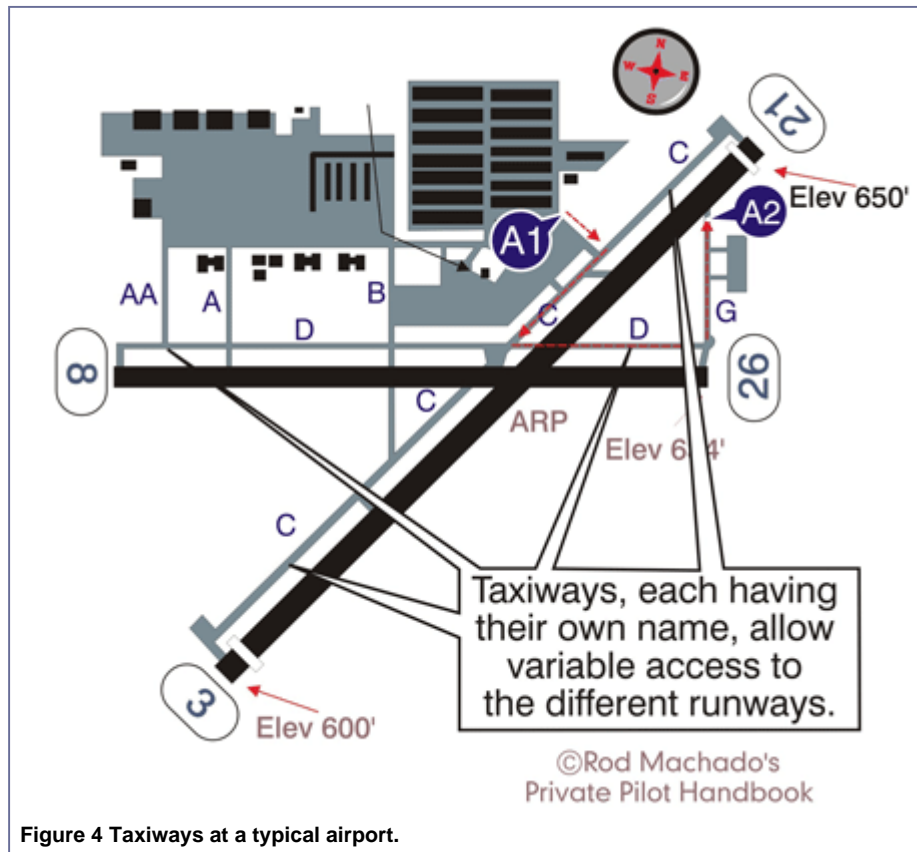
The beginning of the runway is announced with green threshold lights, while the far end of the runway is lit in red. It's an appropriate color to indicate you are running out of usable landing surface (only tractors, bulldozers, and dune buggies beyond those red lights, please!). These lights actually lead a dual life. On one side they're green; on the other, red. Think about it for a second. The beginning (or threshold) of one runway is the end of another. The lights on the threshold of Runway 21 are also at the terminus of Runway 3.

What I've described so far are the basics of runway lighting, which you will encounter at almost any airport that supports night operations. It can and does get a lot fancier. While gathering aviation experience, you're sure to come across airports with sophisticated lighting. In fact, airports with precision-instrument runways can have such detailed lighting that it's possible to mistake it for a prairie fire. Some runways have centerline lighting with embedded lights running the entire length of the runway centerline. Some have brilliant, sequenced, flashing strobe lights leading to the runway threshold. Others have touchdown zone lighting, which looks like a gigantic Christmas tree was squished into the first 3,000 feet of the runway. One of my students said it was so pretty, he wasn't sure he should land on it. You can! See the U.S. Department of Transportation's *Aeronautical Information Manual* (known by pilots as "the AIM") for additional information on these lighting systems.

## Taxiway Markings

There are few things as pitiful as a pilot on the ground, even in the daytime. The King or Queen of the Airways can easily become the Lost Platoon when the gear hits the ground. It is a common misconception that pilots are endowed with some superior ability to find their way around airports. This is demonstrably untrue. Most pilots can find a vending machine blindfolded, but many of us have trouble getting from the runway to the tie-down spot at an unfamiliar airport. Pilots and their airplanes have been extracted from some rather unusual places (like the time a fellow pilot accidentally taxied into a secret military hangar at a combo civilian/military airport. It obviously wasn't much of a secret, since they were in the habit of leaving their doors open).

Figure 4 shows a drawing of taxiway markings from an airport chart.



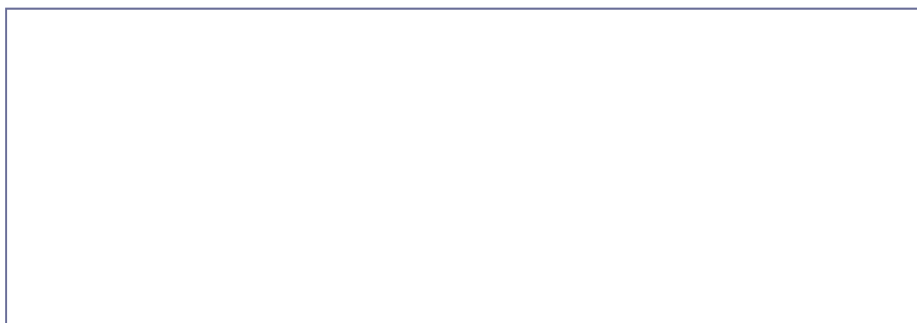
**Figure 4** Taxiways at a typical airport.

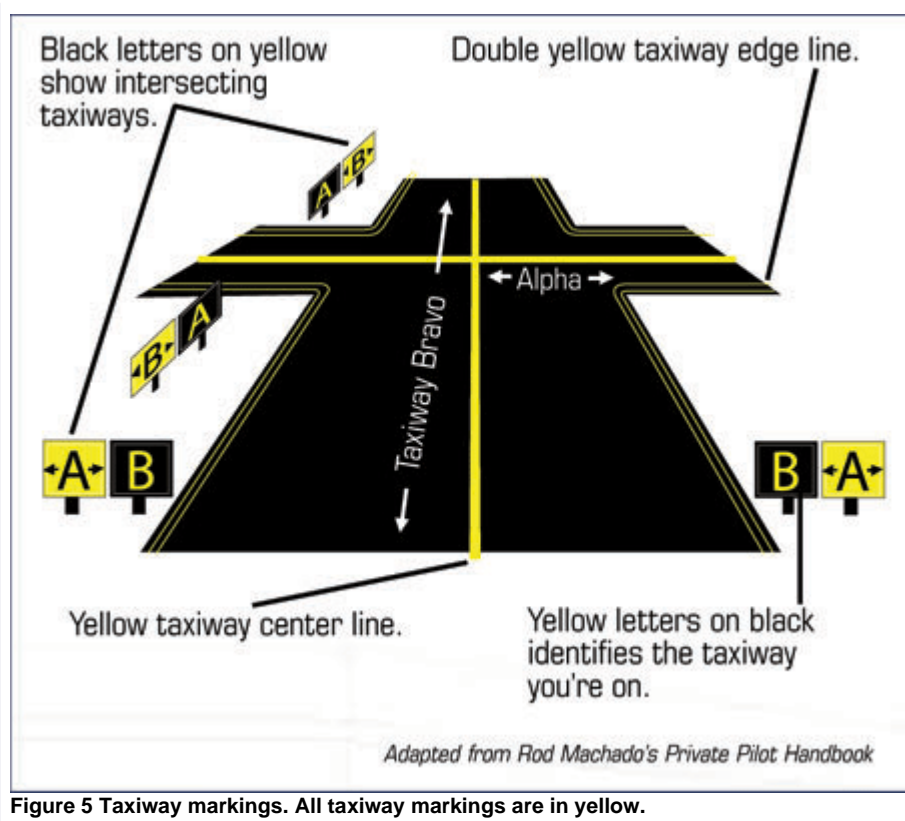
Taxiway D (Delta) parallels the north side of Runway 8-26, and Taxiway C (Charlie) parallels the northwest side of Runway 3-21. There are several intersecting taxiways with individual phonetic names.

At larger airports, and even at smaller ones when ground traffic or construction exists, it's not unusual for a tower controller to offer a complex taxi clearance.

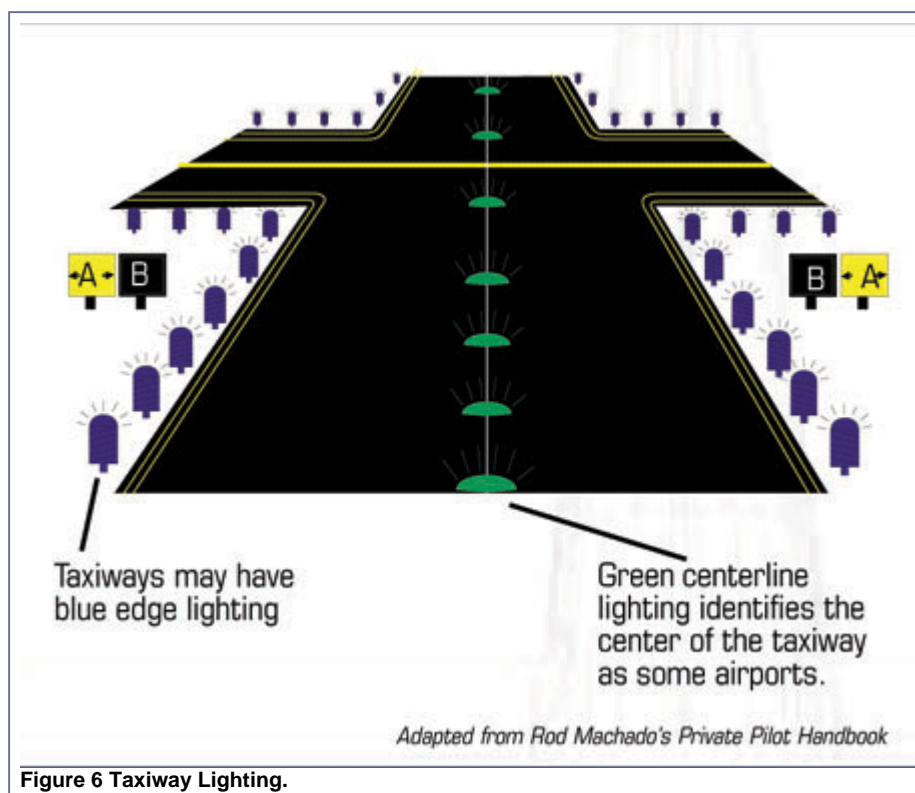
Here's such a clearance: "November 2132 Bravo, taxi to Runway 21 via Charlie, southwest to Delta, turn left; cross Runway 21 and make a left turn on Golf, over." Students normally respond to this clearance with a, "Huh?" If you had an airport chart out, you could easily navigate from position A1 to position A2 in Figure 4 without getting lost. Many varieties of airport charts (similar to the one in Figure 4) are available to make airport-ground navigation easier.

Taxiways are identified by a continuous yellow line with parallel double yellow lines on the outer edges of the taxi surface (Figure 5).





Taxiway names are shown by small signs. Placed along the side of the taxiway, these signs consist of yellow lettering on a black background. Signs containing black lettering on a yellow background indicate the position of intersecting taxiways. Arrows indicate the relative direction of these intersecting taxiways. At night, many (not necessarily all) taxiways have blue omnidirectional sideline lighting (Figure 6).

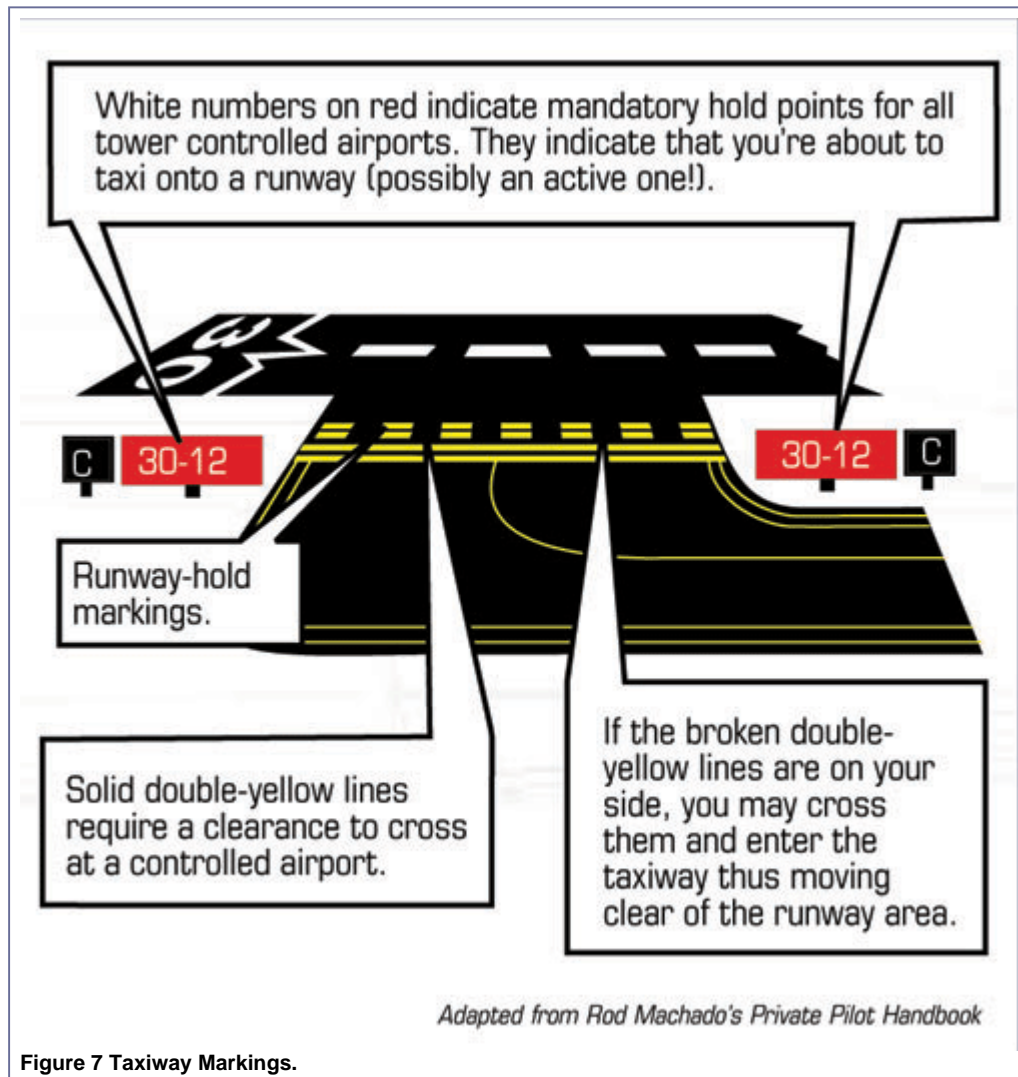


At some airports, taxiways may have embedded green centerline lighting. One time, I caught an empathetic and sensitive student of mine weaving between the embedded green taxiway lights. I thought she was having a flashback until I found out that she was afraid



of damaging either the lights or the tires. You won't hurt the lights or the tires, but feel free (if you wish) to keep the nosewheel a few inches to the side of the embedded lighting.

As a pilot, you must be able to identify the point where the taxiway ends and the runway begins. This transition is identified by four yellow lines—two solid and two dashed—crossing perpendicular to the taxiway and running parallel to the runway (Figure 7), known as runway-hold markings.



**Figure 7 Taxiway Markings.**

If the two solid lines are on your side, then, at a tower-controlled airport, a clearance is required to enter the runway. If the double dashed lines are on your side, then you should cross those lines to clear the runway and enter the taxiway. (From now on, we'll assume that a "controlled airport" is one having an operating control tower.)

Assuming you have just landed and are taxiing off the runway, you should taxi across the double dashed lines and clear the runway. The FAA assumes that your airplane hasn't cleared the runway until the entire airplane (down to the last rivet) is on the other side of those double dashed yellow lines. The reason for this is to prevent the tails of long airplanes (like a stretched DC-8) from poking out onto the runway. This could make landing quite challenging for another pilot and possibly give him or her an extra EKG blip.

At airports without an operating control tower (meaning the airport has no control tower or the tower has shut down for the night), entering an active runway is done at the discretion of the pilot. (From now on, an airport having no control tower or one at which the tower is not in operation will be referred to as an uncontrolled airport.) In this instance, you should hold short of the runway, behind the solid taxiway-hold lines. Taxi onto the runway only when it's clear of traffic and when no airplanes are getting ready to land (known as being "on a short final"). In other words, "Look carefully before taxiing onto the runway." The last thing you want is for someone to do a touch and go on you. And, making another pilot go around won't win you too many friends at the airport. It's also a good idea to broadcast your intentions on something known as the Common Traffic Advisory Frequency (CTAF) when no tower is in operation. This lets other pilots in the traffic pattern know what you're doing. More on this later.

Another way to identify where the runway begins is with a white-on-red sign located next to the dashed and solid double yellow lines (shown in Figure 7). These informational billboards are called runway-holding signs, though they don't actually hold anything. They exist to inform you when you're about to enter an active runway. They also indicate the runway direction. In Figure 7, **30-12** indicates Runway 30 is to the left and Runway 12 is to the right (in other words, go to the left to find the beginning of Runway 30, and so on.).

At controlled airports, these signs are your cue to hold your position unless a clearance has been given to enter or cross the runway. Figure 8 shows a single runway holding sign indicating that the taxiway intersects the beginning of the takeoff runway.

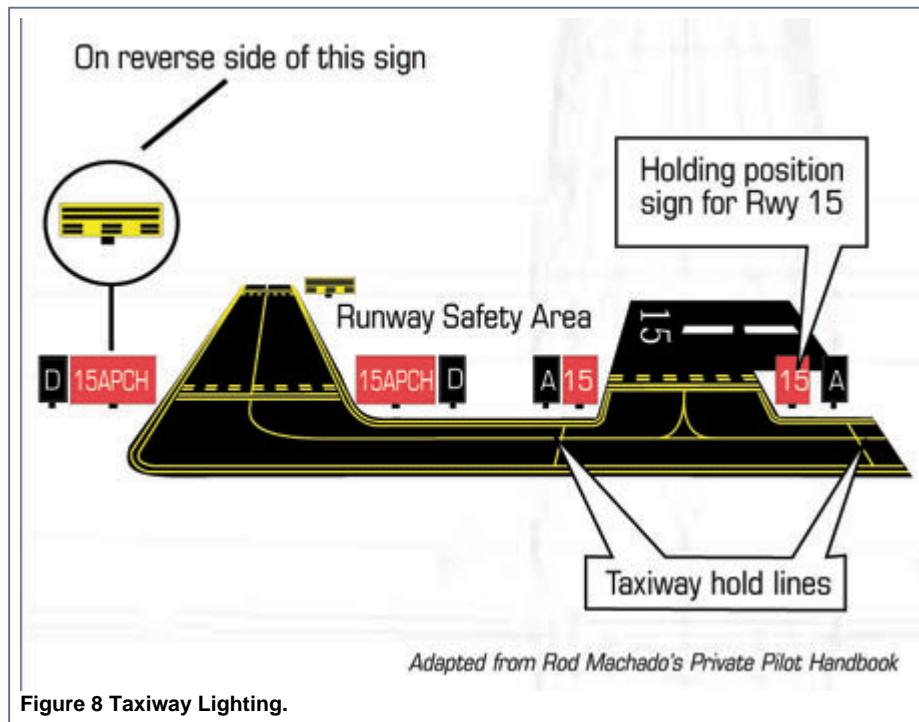


Figure 8 Taxiway Lighting.

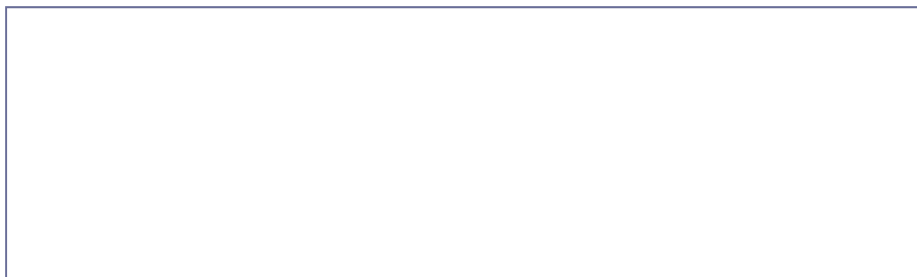
At uncontrolled airports, the runway-hold signs indicate that you can proceed across or onto the runway when you've assured yourself no traffic conflict exists. (An airplane preparing to take off or land is most definitely a conflict.) At a tower-controlled airport, these signs are coupled with the double solid and dashed taxiway-hold lines, providing ample warning that you're crossing into the action area.

Some airports may have taxiways that interfere with the runway safety area, like those shown in Figure 8. Taxiway Delta is located directly behind the beginning of Runway 15. Airplanes landing on Runway 15 could approach low enough to present a problem to both the approaching and taxiing airplanes. This is more likely to be a problem for big airplanes, but the rules take into account the worst-case scenario. Holding-position signs for this peripheral runway are shown by white-on-red lettering. The term **15APCH** next to the solid double yellow lines indicates a mandatory hold point at tower-controlled airports (this means any aircraft on the following taxiway might affect aircraft on approach to Runway 15). On the opposite side of the runway, on Taxiway Delta, on the back side of the runway-hold sign, is a runway safety area sign (normally found only at tower-controlled airports). This consists of the same markings shown on the taxiway (double solid and dashed lines). These signs can be used as a guide in deciding when to report back to a controller that you are clear of the runway. Remember, at uncontrolled airports, pilots must decide for themselves whether to enter or cross a runway.

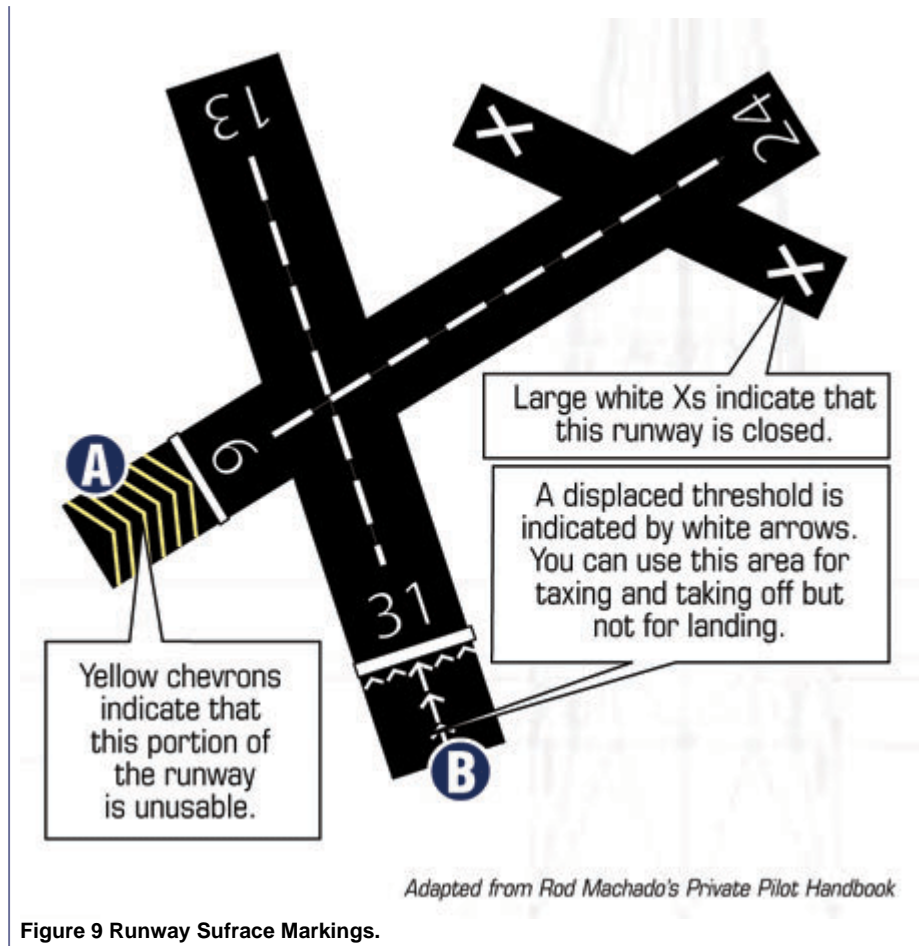
It's difficult, but not impossible, for pilots to accidentally taxi onto an active runway at a tower-controlled airport. One pilot at a busy airport once taxied right into the middle of an active runway and just sat there (probably waiting for one of those yellow trucks to bring him a sandwich). Completely confused about the tower's directions and unwilling to ask for clarification, he stopped his airplane while a jet was on final approach. The tower controller said, "32 Bravo, do you know where you are?" The pilot replied, "Burbank Airport?" The controller said, "Yes, that's good, but do you see that big Boeing 707 out there on final approach headed directly for you?" The pilot replied, "Yes." "Do you want him to do a touch and go on you?" The pilot replied, "No." The controller said, "Then you'd better get off his runway." The pilot, not wanting to get bounced on by a Boeing 707, immediately exited the runway.

## Additional Runway Markings

Just because there is concrete in the shape of a runway doesn't mean that it can be used for landing. Some runways have yellow chevrons painted on them (Figure 9, position A).







This signals that the surface is unsuitable for taxiing, taking off, or landing. It's basically an airplane no man's land. Don't use any portion of this area. It might be off-limits because the surface won't support the weight of an airplane even for taxiing, let alone landing, or because the surface is otherwise unsuitable. Planes that venture onto chevrons can find themselves up to their axles in asphalt and trapped like a gigantic insect on flypaper.

White arrows pointing in one direction form what is called a displaced threshold (Figure 9, position B). This is a runway area that is not to be used for landing, but on which you can taxi, take off, or roll out after landing. Displaced thresholds often exist as part of a noise abatement effort. By forcing you to land farther down the runway, you maintain a higher altitude on the approach than you would if landing at the beginning of the runway. A displaced threshold can exist for other reasons, such as the presence of a surface that will support the weight of an airplane, but not the impact of an airplane landing. (There's a big difference. I know this since one of my instructors used to call out Richter scale values following my touchdowns.)

I won't mention any names, but on occasion, professional airline pilots have been known to land at the wrong airport with a full load of passengers. Nothing like bringing your own audience to a faux pas. Several years ago, a pilot did this at an East Coast airport. He accidentally landed at a small training field with nothing but itty-bitty Cessnas and Pipers fluttering around the pattern. As he touched down and came to a stop, his wheels punched holes in the thin runway surface. He knew he was in trouble when it took full power just to taxi. A few of the locals came out and said, "Hey! Look what you did to our runway! You put divots in it. Geesh!" The only way they could get the airplane out was to completely strip it down to bare-bones metal, making it light enough to take off without further runway damage. The same could not be said for the pilot's career.

Now it's time for you to practice taxiing on Paine Field. Use the airport diagram to help find your way around the airport.

## Airport Diagram Chart

- [Chart](#)

[Fly This Lesson Now](#)  
- top -