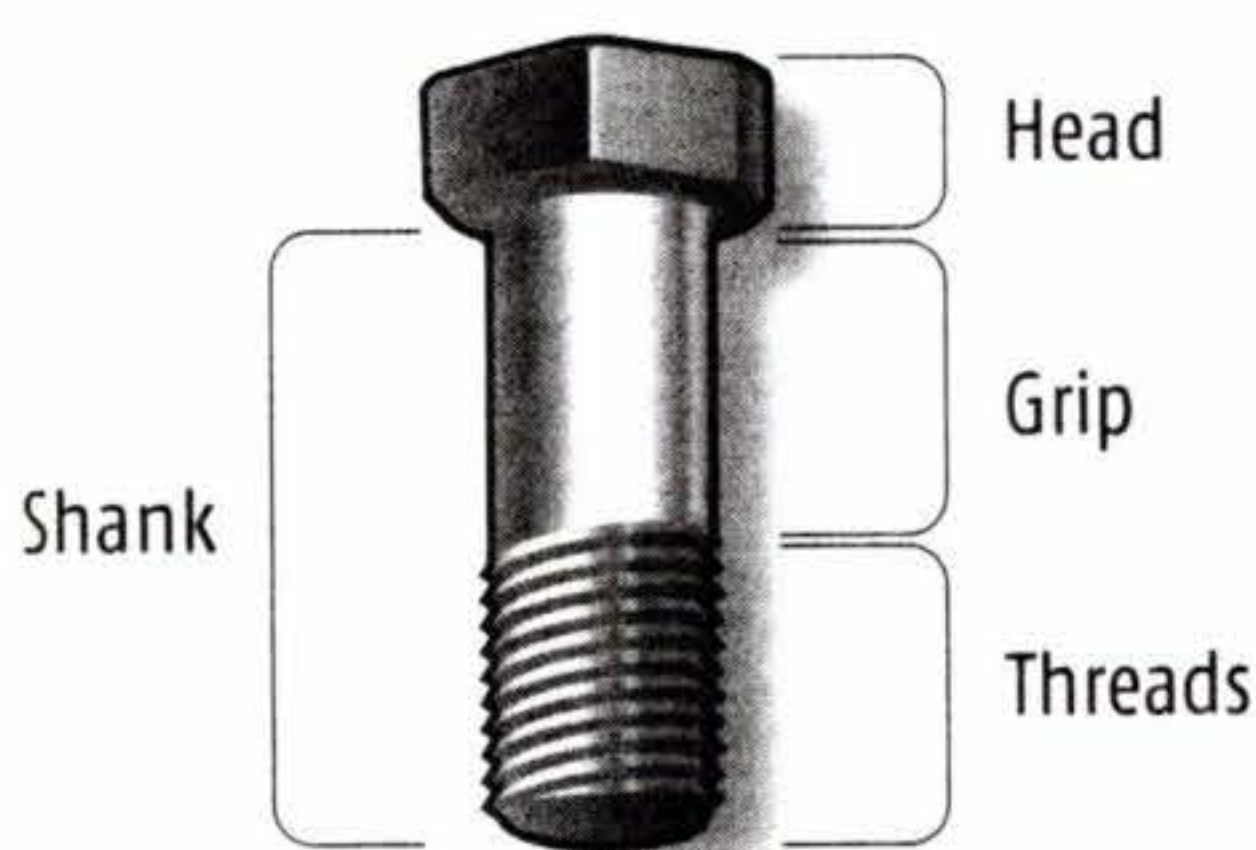

AN Hardware Basics

BY JOE NORRIS

YOU WON'T HANG AROUND a group of homebuilders or aircraft restorers long before you start hearing about AN hardware. AN bolts and their accompanying nuts and washers are the focus of this hint.

AN stands for Army/Navy, the standards to which the hardware is manufactured and tested. Although the AN standard is being replaced by the mil (military) spec (MS) standard for some hardware items, AN is still the most commonly referred to standard among homebuilders. All AN hardware is identified by a code made up of numbers and letters that identify the item.

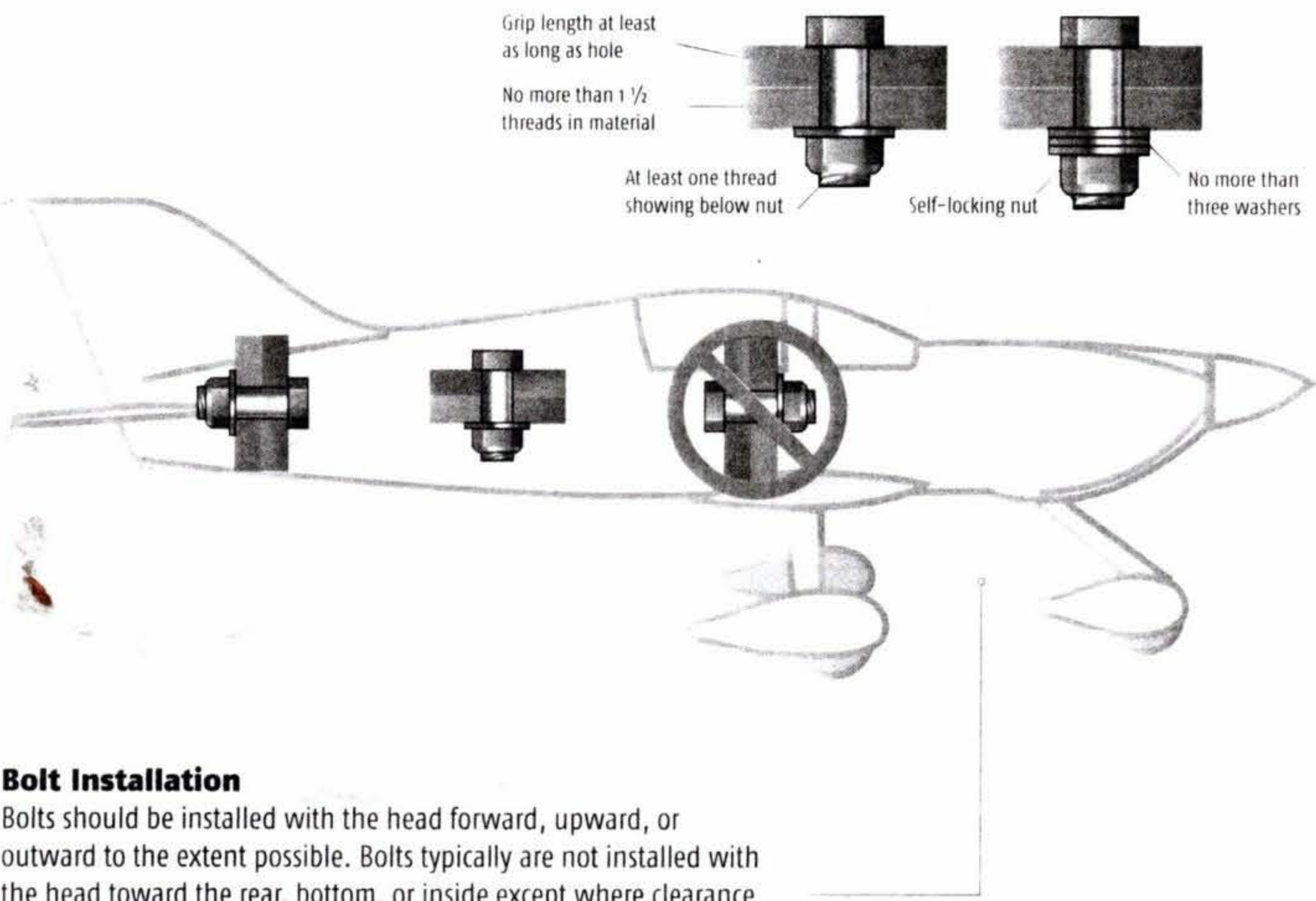
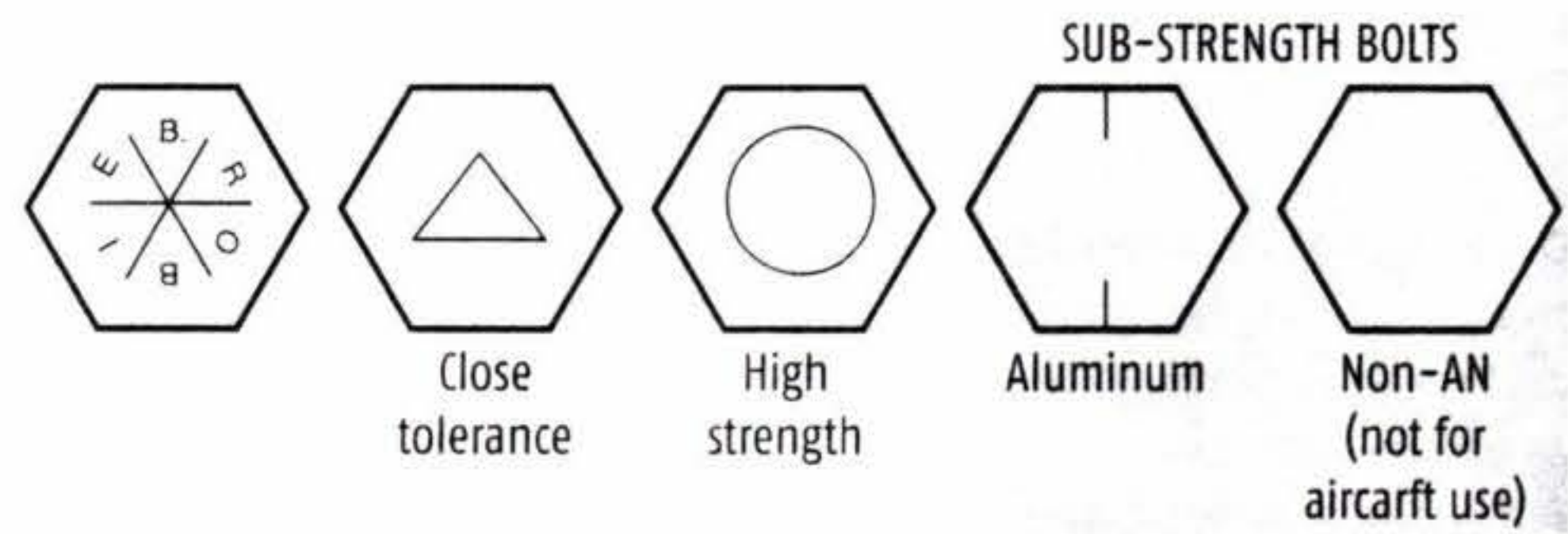
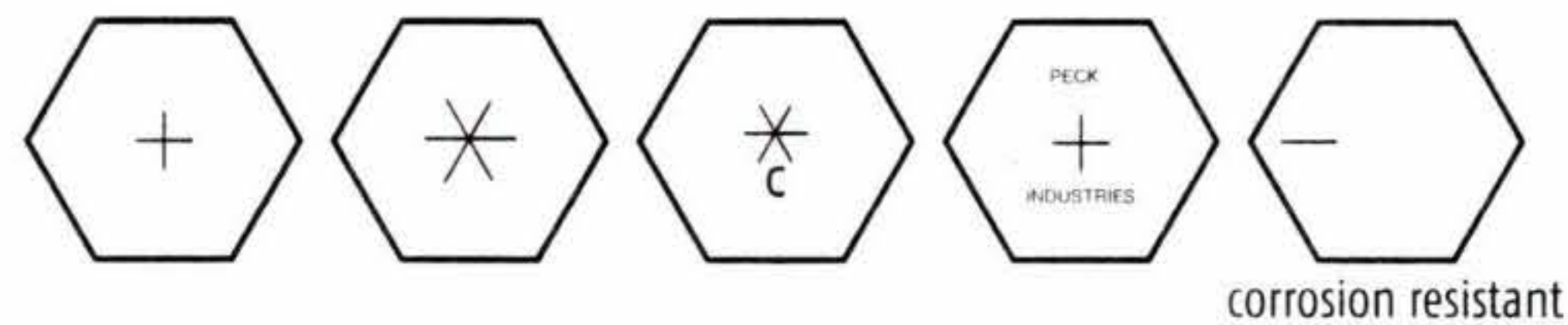


A bolt looks simple, but did you know it has several different sections? At the top of the bolt is the head, where you'll place the wrench upon installation. Beneath the head is the shank, which in turn is made up of the grip and the threads. Bolts come in different diameters and lengths to meet the requirements of the job at hand, and they are called out by numbers and letters so that we can get the size we need. For example, if your plans call for an "AN4-12A" bolt, what size is that? Well, the number after the "AN" indicates the diameter of the bolt shank in sixteenths of an inch. An AN4 bolt is 4/16ths or 1/4-inch in diameter.

The number after the dash indicates the total length of the bolt's shank in eighths of an inch, or inches and eighths for bolts more than 1 inch long. In this case, the 12 indicates 1 inch plus 2/8ths, or a total of 1 and 1/4-inch long. An AN4-24 bolt would be a 1/4-inch diameter bolt that is 2 inches plus 4/8ths

BOLT BASICS

Standard Steel Bolt Head Markings



Bolt Installation

Bolts should be installed with the head forward, upward, or outward to the extent possible. Bolts typically are not installed with the head toward the rear, bottom, or inside except where clearance or access issues require such installation, or when specifically directed to do so by manufacturer's instructions.

APPROXIMATE SHANK LENGTH

Bolt	Wrench Size	Nut (Ny-Lock)	Nut (Castle)	Washer Std.	Washer Large	Cotter Pin	Torque Recommended	Torque Max.
AN 3	3/8"	AN365-1032	AN310-3	AN960-10	AN970-3	MS24665-132-132	20-25 in. lbs.	40 in. lbs.
AN 4	7/16"	AN365-428	AN310-4	AN960-416	AN970-4	MS24665-132	50-70 in. lbs.	100 in. lbs.
AN 5	1/2"	AN365-524	AN310-5	AN960-516	AN970-5	MS24665-134	100-140 in. lbs.	225 in. lbs.
AN 6	9/16"	AN365-624	AN310-6	AN960-616	AN970-6	MS24665-283	160-190 in. lbs.	390 in. lbs.

5 2 1 2 3

If you are installing a bolt in a location that requires you to torque the bolt head, then put the washer under the head of the bolt.

The accompanying chart will help you find the correct washers, nuts, and cotter pins for the popular size AN bolts used on most aircraft. Also included is information on identifying bolts using the markings on the bolt head. With this information you should be able to select the proper hardware for your project, and “talk the talk” when the AN hardware discussion starts.

Download a printer-friendly version of this hint and post it in your workshop for quick reference.

