

**DRILL BIT**

**SHARPENING**

**UNIT**

## Drill Bit Sharpening

### Introduction

#### For Quiz Purposes:

Read Unit 34-12 - 15 and accompanying handout on drill bit sharpening.

#### Reminder:

All angles ground serve two purposes:

- Relief
- Support

#### Parts of the Taper Shank Twist Drill: (See Ditto Handout as you read)

Tang - is the flat on the end of the taper shank that will be used to drive the drill. This tang will fit into the slot in a spindle or sleeve adaptor.

Tapered Shank - The area between the tang and the identification band. It is responsible for alignment of the drill. The taper can be any one of several - Morse which is 5/8" per foot, Brown & Sharpe which is 1/2" per foot, Jarno, National, R-8, etc. (There are many different tapers that have and do exist in the United States today. The most common one in this shop is Morse.)

Land - This is the narrow spiraled surface between the flute and the relief on a drill. This is the only part of the drill that touches the wall of the hole while drilling.

Relief - This is the wide spiraled surface between the flute and the land. It serves as the majority of the cross sectional strength of the drill and the strength of the cutting edge.

Flute - The flutes are the grooves in the drill. Without the flute there would be no cutting edge. The flutes also serve as a path for the chips to exit and the coolant to enter.

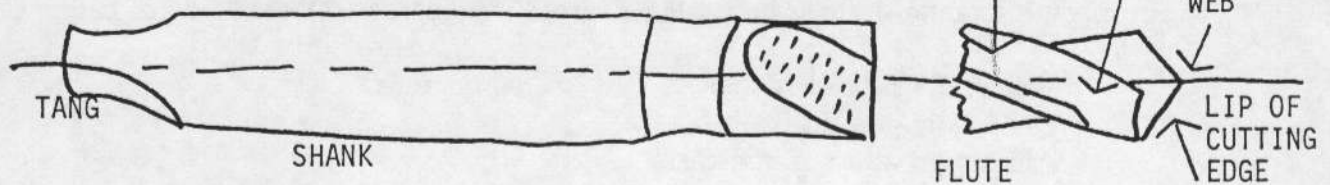
Web - The web is the very center of the drill. It increases in thickness from the original length of the drill as it progresses toward the shank. Older drills that have been sharpened many times, must have an operation performed on them known as "thinning the web." Ask and watch to see this in the demonstration on drill bit sharpening.

Lip Angles - range from 60 degrees included angle to 150 degrees with the general purpose or standard angle being 118 degrees (59 degrees off each side of center.

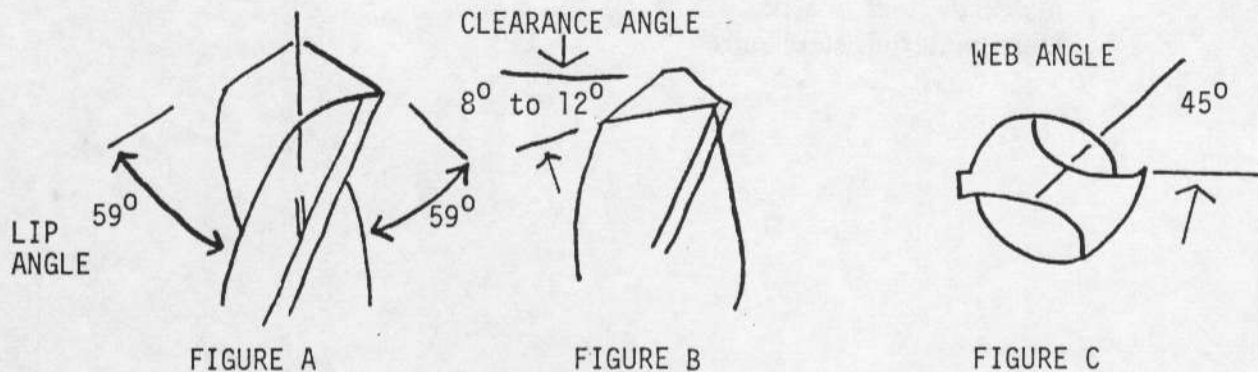
Wood, fiber, hard rubber	= 60 degrees
Deep hole gun drills	= 70
Aluminum alloys & die casts	= 90
Copper alloys	= 100
Soft bronze, brass, molded material, steel, plastic	= 118
Hard material, steel rails	= 150

## TWIST DRILLS

### PARTS OF A TWIST DRILL



### DRILL ANGLES



### POINTS OF DRILL GRINDING

Fully 95% of the difficulties encountered in drilling are due to improper point grinding. Oversize, rough and tapered holes, chipping of the point, breakage of the shaft of the drill are a few of the difficulties caused by poor grinding.

In grinding a drill, three things must be considered:

1. Lip clearance
2. The length and angle of the lips
3. Web angle

Lip clearance is the relief which is given the cutting edges in order to allow them to enter the metal without interference. (See Figure B) The heel, (the surface of the point back of the cutting lip) should be ground away from the cutting lip at an angle of eight to twelve degrees. In all cases, this angle is the angle at the circumference of the drill.

If the angle of the lip clearance is too great, the edges of the cutting lip will break down when the drill starts to work because they will not have sufficient backing to support them.

If insufficient surface is ground away, the clearance of the drill point is so reduced that it ceases to be a cutting edge and refuses to enter the metal. This condition may result in splitting the drill up the center.

DEMONSTRATION NOTES AND THOUGHTS