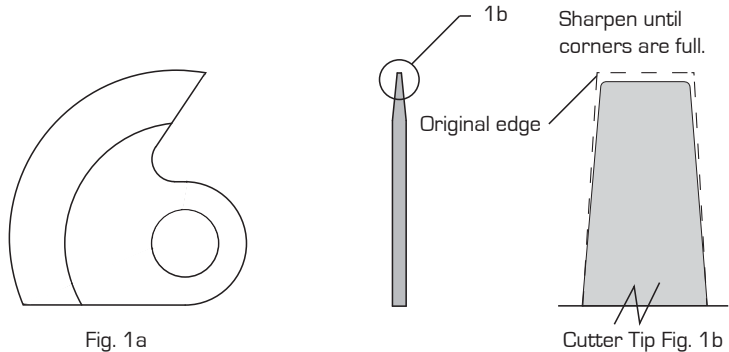


FINGER JOINT TOOLING MAINTENANCE

Maintaining your AceCo finger joint tooling is critical to the success of your finger joint operation. This section provides the necessary information needed to keep your AceCo tooling performing at its peak and includes step-by-step procedures for:

- Preparing a Finger Joint Head
- Balancing Cutter Stacks
- Setting up the Head Using a Single or Multi-post Stand
- Properly Torquing the Head
- Aligning the Grinding Machine
- Sharpening Finger Joint Cutters
- Proper Grinding Wheel Use
- Maintaining Cutting Angle and Gullet



How often you perform these procedures is dependent on many different factors. In particular, resharpening rates are influenced by many factors including feed rate, spindle RPM, species of lumber being finger jointed, type of machine used and types of joints being cut. Joint length also determines when the tooling needs to be resharpened. As shown on page 43, joint length increases as the cutter edge dulls. If the measured joint length is more than 20% longer than the specified length, the tooling needs to be resharpened. Other common signs of dull cutters include excessive tear-out, rip-out, or joints that splinter excessively.

Recommended intervals for the maintenance procedures are:

- Sharpen Cutters: Every 1 to 3 shifts, or as needed depending on conditions
- Align Grinding Machine: Once every ten uses
- Balance Cutter Stacks: Once a month, or every 5 postings
- Post on Setup Stand: After every 5 resharpenings, or when the cutters are 0.025 inches away from the alignment post
- Torque Head: Every time the head is loosened or disassembled

AceCo also recommends that you maintain a logbook for keeping records of all maintenance performed on the cutters and heads.

The steps listed below are in order, however all the steps may not be performed every time. For example, if you have recently balanced and posted your cutters, you may only need to perform Steps 1 and 6.

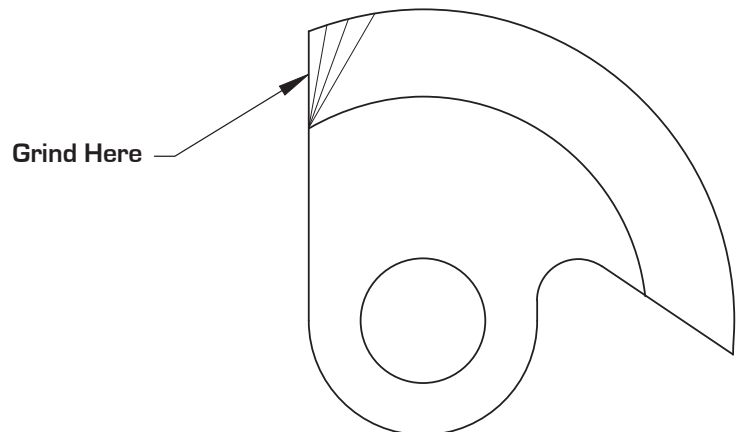
STEP 1 - PREPARE FINGER JOINT HEADS

If head is new, clean all cutter mating surfaces on the index and around the cutter bolt hole, and then proceed to balancing cutters. If head has been used, clean tooling using Technichem **Blade Clean**. For tooling that is relatively clean, proceed to posting on the set-up stand. For heavy pitch buildup, use medium grade Scotch-Brite and WD40 to clean. It may be necessary to remove the cutters from the head and clean thoroughly if there is excessive pitch buildup, rust or corrosion present. Never use abrasives to clean cutters or the cutter head.

STEP 2 - BALANCE CUTTER STACKS

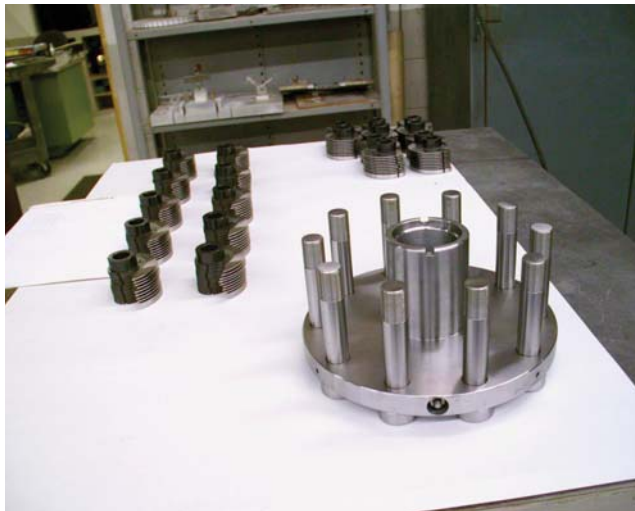
Balancing is critical to the smooth performance of your finger joint head. In order to maintain an equal balance, cutter stacks must be cross-balanced. This means the stack of cutters, along with any washers or spacers, that are 180 degrees from each other must be weighed and balanced equally to within one-tenth (0.1) of a gram. If one stack is heavier, carefully grind a small amount off the back of the cutter only, as shown.

Typical industrial usage requires cutter stacks to be balanced once a month.





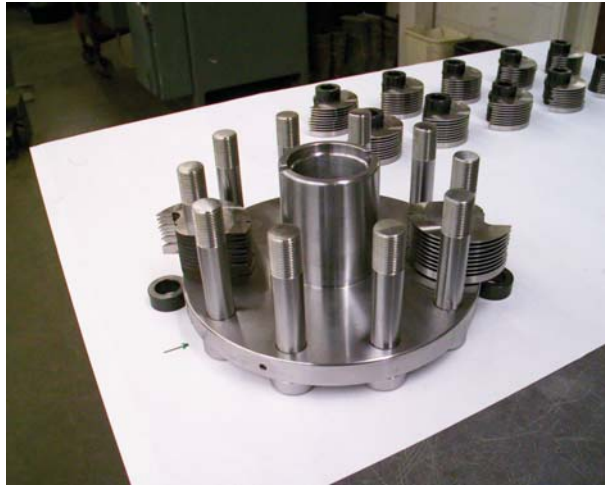
**Cutter Stacks & Washers
Balanced to 0.1 Gram**



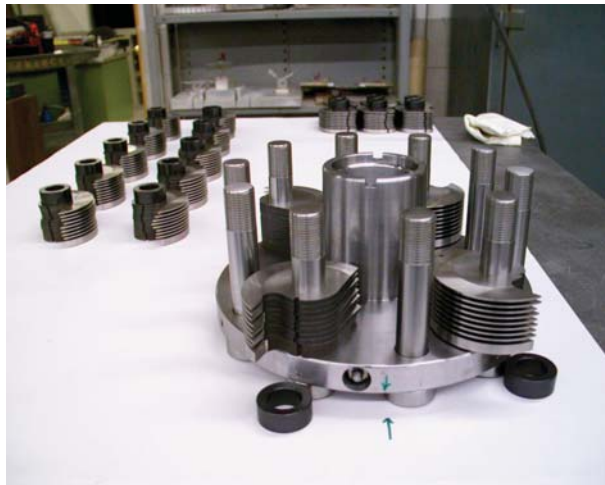
**Finger Joint Head is clean
and ready to install cutters.**



**Starting point of head or bolts should be
marked.**



Place first stack and then second opposing stack. Balanced washers are placed next to the bolt.



Third and Forth stacks are placed.



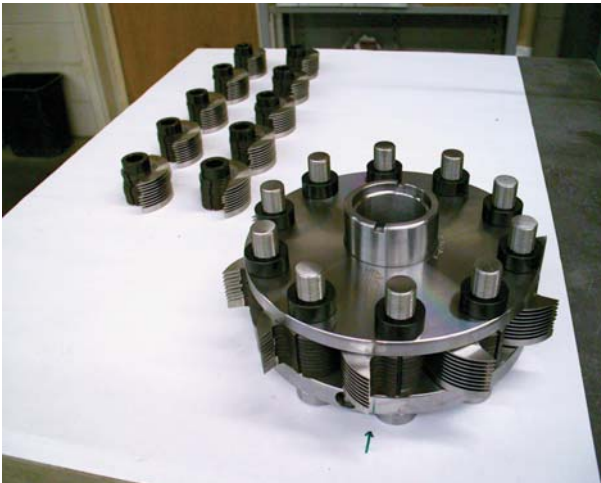
Stack Five and Six.....Seven.....Eight.

Head is ready for top plate.

DO NOT INSTALL TOP PLATE UNTIL ALL BOLTS ARE FILLED WITH CUTTER STACKS.



Top plate installed.



Washers installed.



Anti-seize is applied to the bolt threads.



Nuts are installed. Each nut is stamped with a number that corresponds to the number stamped on the head plate near the bottom of the bolt.



Nuts are hand tightened to hold cutters into place to make it easy to install on the set-up stand.

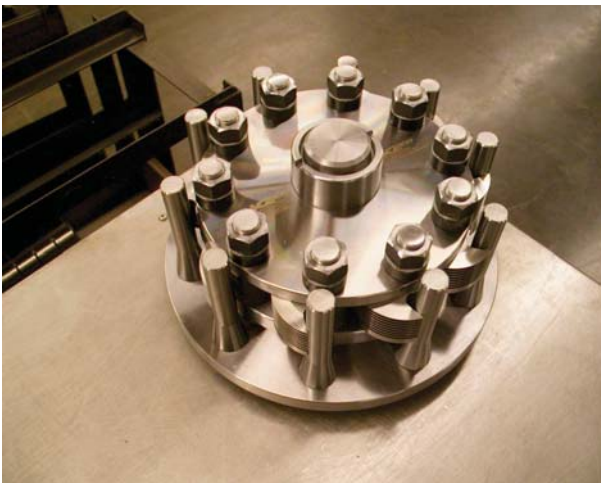


Carefully place the head onto the set-up stand.





Carefully place the head onto the set-up stand.



Head is placed on the center pin, so the bolts are lined up with the stand posts.



Cutter stacks are rolled forward to contact the stand posts to within 0.002" (0.04mm).

STEP 3 - SET UP CUTTERS IN THE HEAD

Using a Multi-post Set-up Stand

Multi-post stands offer an easier and quicker way to set-up the head. Multi-post stands come with a stationary posting positioning pin which is pressed into the stand and a moveable torquing positioning pin that fits into the offset hole.

1. Secure the set-up stand by bolting to a bench or stand.
2. Place the torquing pin in the correct offset hole depending on the rotation of the head. For clockwise rotating heads, the pin will be placed counterclockwise of the center pin. For counter-clockwise rotating heads, the pin will be placed clockwise of the center pin.
3. Roll the cutters back for easy clearance and carefully slide the head onto the center post of the set-up stand.
4. Slip the bolt onto the offset torquing positioning pin adjacent to the center hole.
5. Loosen all the nuts in a crisscross pattern to reduce excessive bolt stress, and to prevent the top plate from warping. Never use a torque wrench for loosening nuts, only use a breaker bar.
6. Lift the head and rotate to slip the bolt onto the center posting pin.
7. The head is now ready to be setup for the correct cutting alignment. When setting up a collet style head, always use collets on the set-up stand spindle post to increase the accuracy of the setup.
8. Pull forward the first stack of cutters. Hold all cutters tightly against the setup post so that a .002" feeler gauge cannot pass between the cutter faces and the setup post.
9. Apply thread lubricant to the threads (Anti-Seize or equivalent).
10. Hand tighten the nut while holding the cutters in their forward position. This will keep the cutters from rotating out of alignment while setting up the other stacks.
11. Repeat steps 8, 9 and 10 on each cutter stack until all bolts have been hand tightened and secured enough so cutters do not shift or roll out of position. Every time the cutter head is reset, it must be resharpener afterward to maintain a constant cutting circle.
12. Lift the head up and rotate back to slip the bolt onto the torquing pin.
13. The head is now ready for the Torquing procedure - see page 36.



STEP 4 - TORQUE HEAD

Once the cutters are setup, you need to secure the top plate against the cutter stacks with AceCo hardened washers and nuts. This is a simple process; however, a few critical steps must be followed to ensure safe operation of your cutter head.

- Once the cutter stacks are all setup, slowly rotate the head away from the alignment post into the off-center torquing position:
 - Single post Set-up Stand: re-insert the torquing L-pin into the off-center hole and into the bolt head.
 - Multi-post Set-up stand: insert the bolt head into the positioning torque pin
- AceCo highly recommends using a metal base thread lubricant (Anti-Seize or equiv.) before torquing the nut down - do not use oil. The use of thread lubricant will dramatically increase the clamping force [as much as four times] on the cutters for the same amount of torque. Less torque can then be used and less head distortion will result. It is important not to allow any lubricants or debris to come in contact with the mating surfaces of the cutters or the top and bottom plates of the cutter head. Lubricants or other debris on these critical surfaces will allow the cutter stack to roll out of alignment. Always apply the Anti-Seize after the top plate is installed - this will prevent any excess lubricant from lodging itself between the top of the cutter stack and the underside of the top plate.
- At this point, the nuts should all be hand tight. Inspect the bolt threads; if more than 1/8" is sticking up through the nut, you should use an additional or thicker hardened washer to take up the excessive space. This will guarantee a firm hold and prevent any thread damage. Always try to use washers that allow all the threads in the nut to be utilized. The threads of the bolt should exit the nut. Always put washers under the nut on the outside of the top plate. The top plate will give more surface area for holding cutter stacks in place.
- When torquing, you must tighten the nuts in a crisscross pattern to ensure level tension is maintained on the top plate. First, tighten one nut (#1 position) to 50 foot-pounds (68 Nm), then tighten the nut directly across from it (#2 position) to the same 50 foot-pounds (68 Nm).
- Next, tighten the remaining nuts; following the number order of the chart until all nuts have been torqued to the same 50 foot-pounds (68 Nm).
- Complete the same torque sequence and tighten the nuts to 100 foot-pounds (136 Nm). If counter-clockwise rotating heads have problems with cutters pulling away from alignment post when torqued to the first 50 lbs. increment, then only torque to 15 lbs. increments until 50 lbs. is reached. AceCo offers left-handed bolts if problem persists.
- Repeat this step while increasing torque in 50 foot-pound (68 Nm) increments each time, until the ideal range is reached. For 3/4" bolts, a minimum of 150 foot-pounds (204 Nm) is required, as a general rule. Tool pressure and stack height variations may require more torque. For 9/16" bolts, 100 foot-pounds (136 Nm) is generally required. Over or under tightening can result in bolt and/or cutter damage. Next, the cutter heads will need to be resharpened (see pages 37 through 40). Call AceCo for assistance if torque value is uncertain.

- NOTES:**
- Always have your torque wrench calibrated at least once every year.
 - Never use a torque wrench to break loose a tightened nut.
 - When loosening nuts to replace or repost cutters, loosen in gradual increments using the same sequence as torquing.
 - Always use a breaker bar to loosen the nuts.

Centrifugal force can also influence the torque needed. The amount of torque required to keep a stack of cutters from rotating will increase as the Surface Feet Per Minute (SFPM) of the cutting circle increases. For instance, the normal operations of a 10-1/2" or 9" cutting circle rotating at 3,600 RPM will have a SFPM of 9,896 ft./min. and 8,482 ft./min., respectively. If a larger diameter head or higher RPM is used, then an excessive amount of centrifugal force could roll the stack of cutters. Most cutter stacks will actually roll forward since the central mass of the cutter is set back in the head and will spin away from the center of the rotating axis. Even spindle motors with slower start-ups ("Soft Start") will ultimately roll stacks if the eventual RPM or SFPM is too high. We recommend a SFPM of no higher than 11,000 ft./min. This can be calculated using the Cutting Speed formula on page 28 of this manual. Higher SFPM values will require disc spacers in between the cutters to assist the friction between cutters; however, when spacers are added between cutters, the effective cutter index is increased and joint length is also increased.

