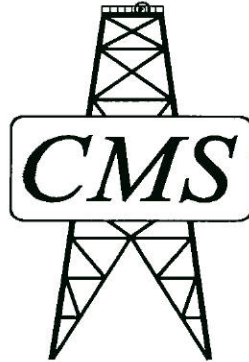


**Cooper Manufacturing & Supply, Inc.**



**ISO 9001 CERTIFIED**



***ALIGNMENT TOOL***



## Casing Alignment Tool

The **Cooper Manufacturing & Supply, Inc. Casing Alignment Tool** was designed for use in repairing well bore casings where the casing string has parted and shifted out of place, or where extensive milling operations have cut through casing and left a gap of weak pipe or no casing at all.

### Construction

The construction of the tool is rugged and simple. It is built in 12 foot sections with a solid center body with aluminum blades welded to the center body. Each section is then machined to the drift diameter of the size and weight of the casing that it will be run in. These sections are then assembled by threaded connections, with the blades overlapping the next section. Each section and overlapping blades are then welded together for strength to complete the finished tool. The standard tool is 24 feet in length, with 18" of fishing neck at the top of the tool, and 18" of tapered nose at the bottom of the tool. The stabilizing and aligning blades have a length of 21'. Tools can be built and assembled to any size and length as specified by the customer.

### Operation

Before the **Cooper Manufacturing Alignment Tool** is run, it is advisable to make a trip in the well bore with a full gauge lace joint or string mill on a stabilized bottom hole assembly the same size and length as the alignment tool. This will insure that the alignment tool will be free to pass through the bad place in the well bore, and that the casing is capable of being realigned. If the lace joint or string mill will not go through, then some milling may have to be done before the alignment tool can be ran. When this has been done, the alignment tool is then ready to be run, providing that there are no open perforations below where the casing is to be repaired. If there are open perforations or if the well bore is taking fluid for some reason, then a balanced cement plug or some type of plug should be set far enough below where the alignment tool is to be set to keep any cement from going down hole while cementing the casing in place.

The alignment tool is run on the bottom of a cement retainer, by means of a special built ported aluminum sub that replaces the junk pusher bottom of the cement retainer. The cement retainer and the alignment tool are connected together with a special built slack joint. This slack joint insures that the cement retainer will set completely, if the alignment tool is pushed into tight casing.



The tool is then run down hole on the drill string to where the bladed section of the tool overlaps the top and bottom of the parted or bad section of casing. The cement retainer is then set and sheared off. The drill string can be tested as well as the annulus tested, then cement operations are ready to begin.

In the event that the part or bad section of casing is in a long section of perforations, or for any other reason which would prohibit running the cement retainer on top of the alignment tool, bladed stabilizer extensions can be run between the cement retainer and the alignment tool, to keep the cement retainer set in good casing.

### **Cementing**

Once cementing operations are started, it is very important to get a good cement job. A running type squeeze job is best. If cement is just pumped down and allowed to set or staged in, usually when it is drilled out there will not be enough cement on the outside of the pipe to hold the casing aligned in place. If a good squeeze job cannot be achieved, the cement should be over-displaced, and allowed to set for two to four hours and then attempt another cement job. Remember that this cement has to hold the casing in place and keep the well bore aligned after the alignment tool and cement have been drilled out and removed from the well bore.

### **Cleaning Out The Well Bore**

After a successful cement job is performed, and the cement is allowed to set, the well bore is cleaned out by first tripping in hole with a bladed mill and milling assembly. The cement retainer is then milled up, along with the aluminum slack joint down to the fishing neck of the alignment tool. It is important to have an accurate measurement of the cement retainer and slack joint before running it in hole. The milling assembly is then pulled from the well bore and replaced with a special designed burning shoe, and enough washpipe to cover the length of the alignment tool. The shoe is dressed with an inside diameter that only the center body of the tool will pass through. This will keep a fishing neck on the top of the alignment tool. The crown of the shoe is dressed 1/4" to 1/2" smaller than the drift or bit size of the casing. Stabilizer pads are then put on the OD of the shoe one foot above the crown, and about 8 to 10" below the box connection on the shoe. The lower stabilized pads are dressed with kutrite and the top pads are slick OD. These pads are then ground and turned to the drift or bit size of the casing. These special type shoes will allow the crown of the shoe to get by the parted area while cutting over the alignment tool and the lower dressed pads will dress up any lip or burrs which may be left in the parted area.

The special designed shoe and washpipe are run in the well bore, and the blades of the alignment tool are milled away along with the cement around the tool until they are past the parted area or the alignment tool is free to go down the well bore. In some instances, the center body and remainder of the alignment tool are retrieved from the well bore in the washpipe. If the tool is not recovered in the washpipe, then an overshot can be run to retrieve any of the tool left in the well bore.

After the alignment tool is removed from the well bore, a smooth OD lace joint can be run to dress up the repair on the parted casing, returning casing to a full drift ID.

### **Successful Applications**

This tool and procedure has been used successfully by Damson Oil in Eastern Mississippi to repair parted casing with a four foot void between casing ends at a depth below 10,000 feet. It has also been used by Conoco, Inc. Offshore to repair 7 5/8" casing which parted uphole at 6750' while drilling a sidetrack hole at a depth of 10,600'.

Other applications for this tool have been used by Chevron, Hunt Oil, Shell Oil and Mobil. This tool has also been used by PPG Industries to repair parted 13 3/8 casing in a Brine well at a depth of 1100'. Over 2500 sacks of cement was used to squeeze this casing before it would stay in place. After the alignment tool was removed and the casing dressed off, it was tested and no leaks were found.

**Cooper Manufacturing** makes no guarantee or has any warranty that this tool will completely repair any type of casing problems. We will try to give our customer the best service and top quality tools to perform all operations to repair the well bore to its original condition.

Any other information as to the cost, building or application of this tool can be obtained by contacting **Cooper Manufacturing & Supply, Inc.**



## Casing Alignment Tool

The standard tool is 24' long but can be ordered in any length or stabilized extensions can be run above tool.

CENTER BODY OD IS DETERMINED BY THE CASING SIZE THAT TOOL IS ORDERED FOR.

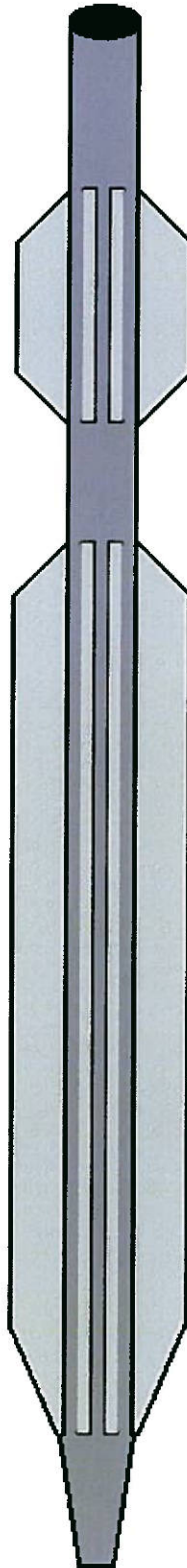
4 1/2 to 5" Casing.....	2" OD
5 1/2" Casing.....	2 1/2" OD
7" to 7 5/8" Casing.....	3 1/2" OD
8 5/8" Casing.....	4" OD
9 5/8" Casing.....	4 1/2" OD
10 3/4 to 10 3/8" Casing .....	5" OD

Standard blades are 3/8" aluminum flat bar welded to a center body. Heavier blades can be ordered on larger tools.

Blades are turned to drift size of casing that tool is ordered for.

Six blades are used on tools up to 7 5/8" OD casing; more blades are added on larger size tools.

PRICES QUOTED ON REQUEST.  
DELIVERY QUOTED WHEN TOOL IS ORDERED.



Fishing Neck 18" long

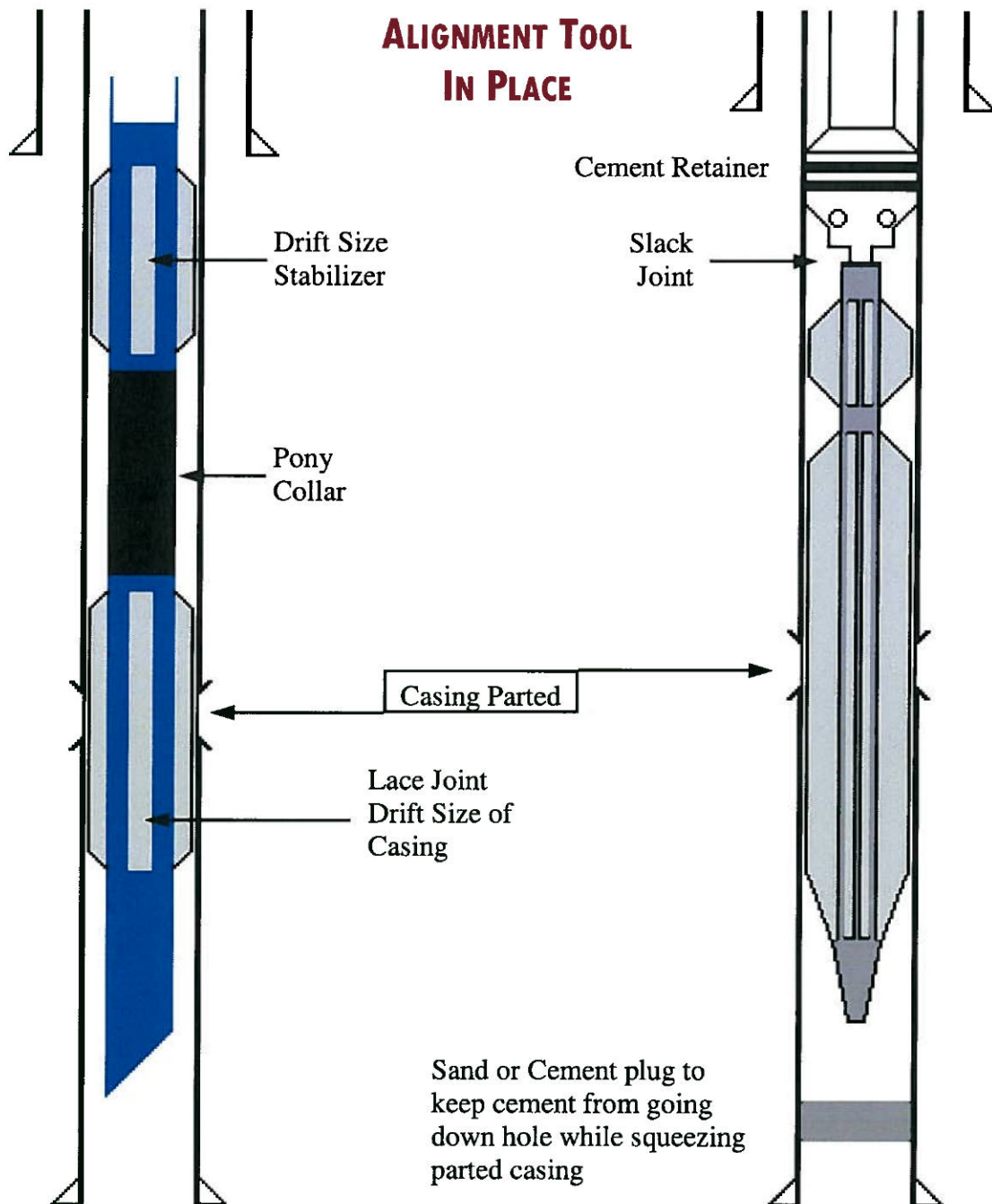
Drift size OD blades 18" long

Groove for handling clamp

Drift size OD blades approx. 19' long

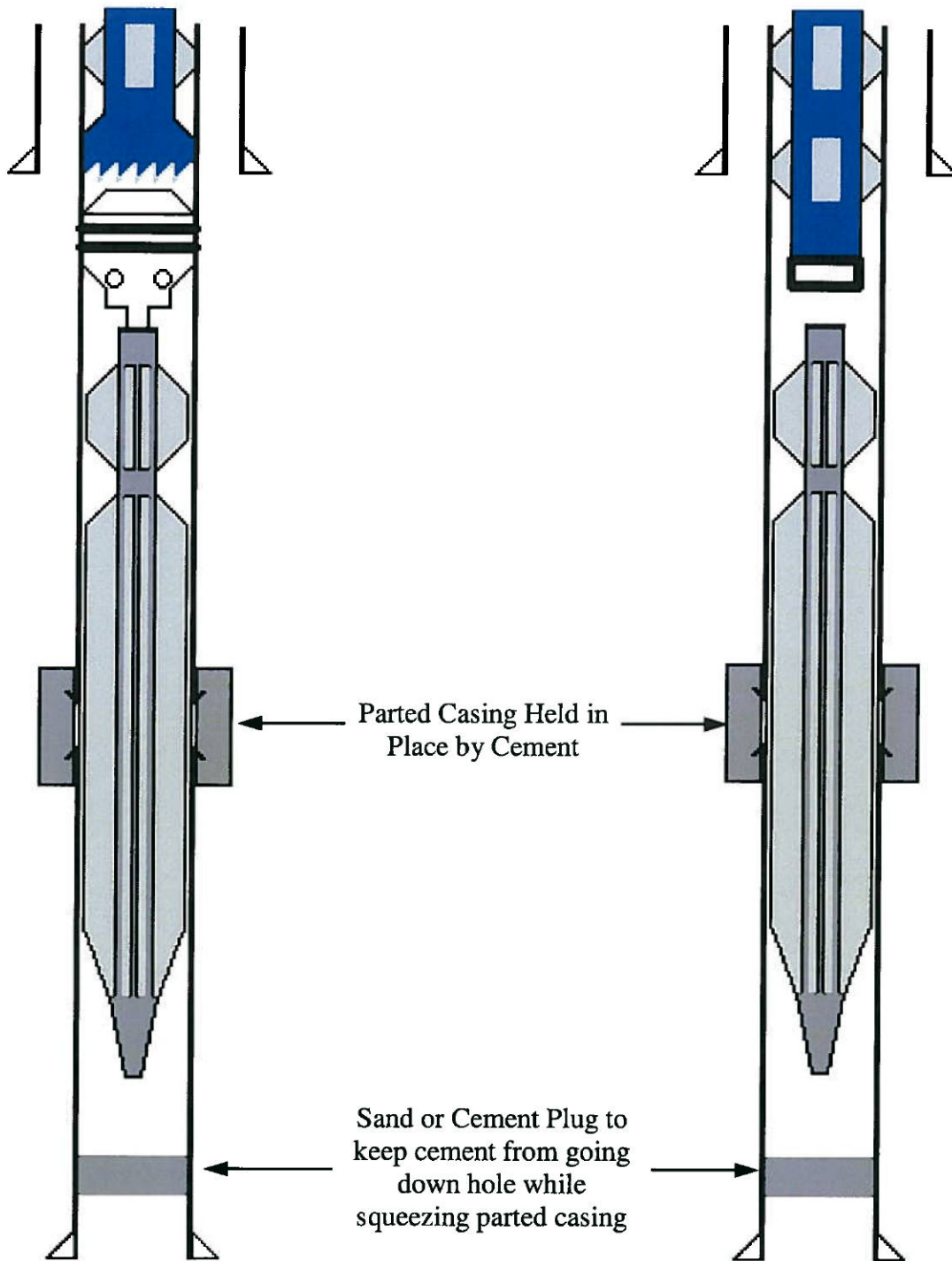
Blades start to taper to body size for 12-18"

Body size tapered to 1 1/4" OD in 18"



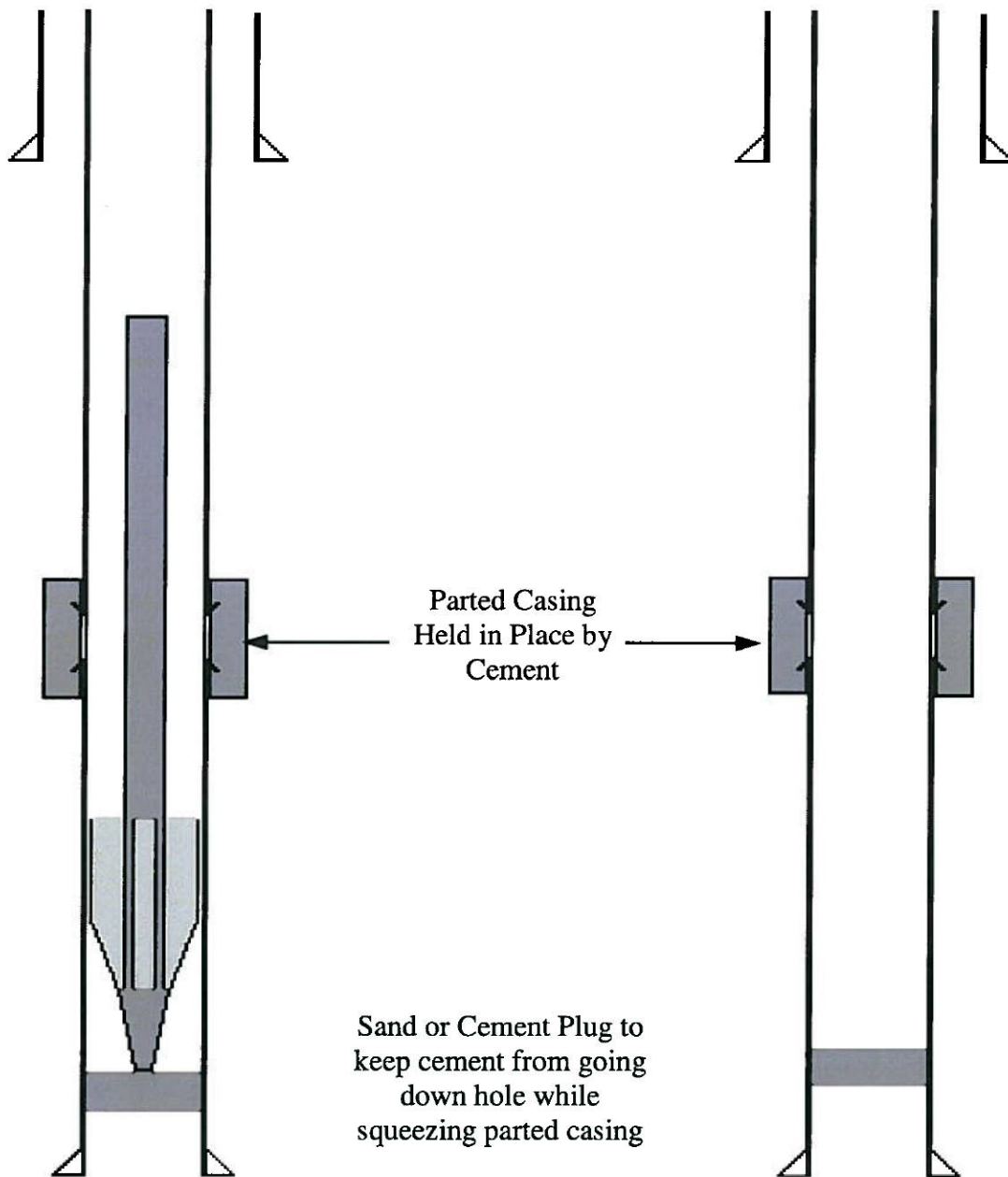
A drift size lace joint, pony collar and a drift size stabilizer should be run through the parted area to clean up any rough edges and insure that a stiff BHA the size of the alignment tool will go into the parted area and align the casing to be cemented in place.

Alignment tool is run and spotted across parted area. Cement retainer is set and parted casing is ready to be cemented in place.



*After a successful cement job is completed.*  
Trip in hole with a full gauge mill, boot basket, and stabilizer. Mill up the cement retainer and the slack joint to top of fishing neck on alignment tool. POOH

Trip in hole with special built stabilized burning shoe and enough washpipe to cover alignment tool. Mill over blades and cement until tool is free and goes down hole.



After blades and cement are milled over, tool will drop down hole. Shoe and washpipe are pulled out of hole. Overshot is run in hole to fish out remainder of tool.

With alignment tool out of hole and casing repaired and tested, the bottom plug can now be removed.