Rotating Side Arm

By Mike Wetzel, W9RE

Prompted by several requests at Dayton regarding my rotating side arm, I would like to present the information on it. The side arm described works very well on Rohn 25 and 45 and can also be adapted to other similar sized towers. It gives approximately 300° rotation and, using the construction described, is extremely rugged.

The terminology used by various people is somewhat vague, so first let me define some terms that I use. "Swing arm" is the part that is usually tubular, connects to the rotator and turns. The "side arm mount" consists of angle and plate. Both "side arm bearing" and "side arm rotator" mounts are the parts that attach to the tower and either hold the bearing or the rotator (see Figures 1 and 3).

I have used my side arm rotator mounts with Ham-Ms, Hygain Roto-brakes, Tailtwisters and prop pitches. My side arm bearing mounts have used stock flange bearings and homemade wood bearings.

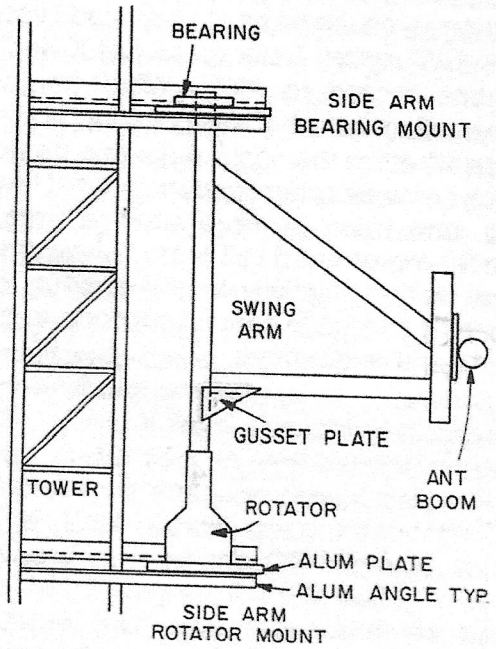

Fig 1—Rotating Side Arm

	25 G	45 G
A	23-1/2"	30"
B	22-1/2"	18-1/2"

MATL 1-1/2" PIPE
SKED 40

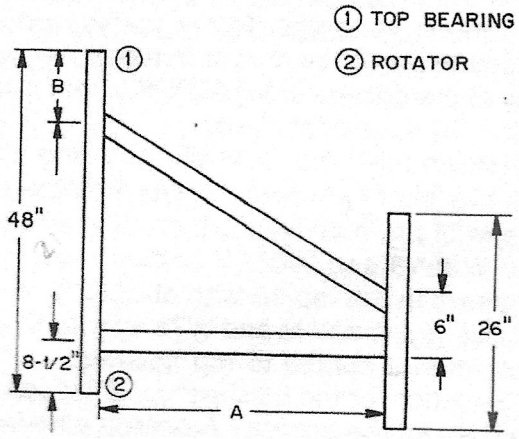

Fig 2—Swing Arm Details

The swing arm is made from 1½-inch schedule 40 water pipe and is welded (I couldn't come up with a way to avoid this welding). The side arm mounts are made of 2-inch × 2½-inch × 3/16-inch aluminum angle, 3/8-inch aluminum plate, hex head cap screws and U-bolts. All aluminum is 6061-T6.

My side arm mounted antennas presently are as follows:

1) Rohn 45, 52-ft boom 7-element log-Yagi for 20 meters, mounted at 75 ft on 140-ft tower, prop pitch rotator.

2) Rohn 25, 42-ft boom 5-element razor beam for 15 meters, mounted at 40 ft on 100-ft tower, Tailtwister rotator.

3) Rohn 25, 32-ft boom 5-element razor beam for 10 meters, mounted at 55 ft on 90-ft tower, Tailtwister rotator.

4) Rohn 25, 204BA 4-element 20-meter beam mounted at 60 ft on 140-ft tower, Ham-M rotator.

The side arm mounting seems to exhibit a much larger force on the rotator than would be experienced with the antenna mounted on a straight mast in the conventional way. As verification of this fact, I originally tried using a Ham-M rotator on the

Cost/Quantity Data

Description	*Quantity* 25G	45G	*$Standard Length*		*$Pro-rated Low Qty*	*$Pro-rated Larger Qty*
Al. angle	96-in.	116-in.	21-ft	$84	$ 42	$ 26
1½-in. pipe	124-in.	136-in.	21-ft	$36	$ 18	$ 18
Al. plate 8-in.W	32-in.	32-in.	48-in.	$50	$ 36	$ 20
Bearing 1-15/16-in.	1	1		$35	$ 35	$ 35
U-bolts 5/16-in.	10	10		$ 8	$ 8	$ 8
Welding				$40	$ 40	$ 40
Totals				$253	$179	$147

- U-bolts #011, Chicago Hardware for 1-in. pipe, 5/16 × 1-3/8 × 2-3/16, 1-in. thread.
- Aluminum plate 3/8-in. × 8-in. wide called rectangular bar (extruded) 6061-T6511, stock length 12 ft, cheaper because it doesn't have to be sheared.
- Prices per pound on the aluminum were $3.50 for small quantity, $2.19 for #100 and over.
- The flange bearing could be eliminated on small antennas and a wood one substituted.

10-meter beam (approx 8 sq ft). I found that any wind over 55 mph would either shear the brake housing or would break the brake wedge. Also, I tried a Rotobrake on the 20-meter log-Yagi antenna (approx 15 sq ft) and found that, over about 70 mph, the large gear would break a tooth. All antennas have been in the air about 10 years except for the 204BA, which has only been up a year (thus explaining why the Ham-M has held so far). Also, the 204BA is the only antenna/rotator that is not pinned. Not pinning definitely helps the situation, but also gives you a lot of exercise climbing towers to reorient the antennas after windstorms.

The only failure besides rotators has been with the 20-meter swing arm which, after seven years with the 52-ft boom antenna, fatigued and broke just above the rotator. The solution to this failure was to add two ¼-inch steel gusset plates approximately 5-inch × 3-inch to this round to round pipe joint. I have noticed no deformation of any other part whatsoever. The heaviest part of the whole set-up (excluding the rotator) is the swing arm weighing 32 pounds, with the side mounts about 11 pounds each.

The cost of each side mount depends on your price break of the aluminum parts, ie, if you buy enough angle and plate for one side mount it is rather expensive; but, if you have some on hand or can get a group order together, the price comes down rather well. Local costs (5/87) for 1 length of 1½-inch water pipe is $36, 1 (21-inch) length of aluminum angle is $84, 1-15/16-inch flange bearing is $35 (I substituted wood on 10- and 15-meter mounts), 3/8-inch aluminum plate 8-inch × 4-inch is $30,

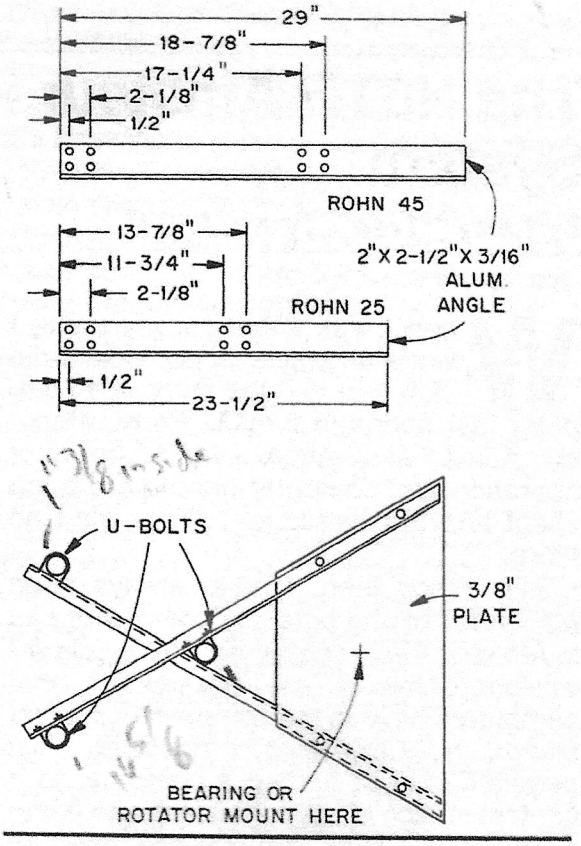

Fig 3—Bearing Plate Detail

U-bolts (10 used per mount) 5/16-inch × 2-inches are 75 cents (I closed up these U-bolts for a better tower leg fit).

The small stub mast on the swing arm could be replaced with a plate to match your boom to mast plate on the antenna. The reason I did not do this was because my antennas were an odd number of elements, thus putting an element very close to the

tower, which necessitated skewing the antenna boom with respect to the swing arm a bit so as to clear the tower with the element close to the tower. It also allows fine tuning the antenna direction with respect to straight south if your tower orientation isn't exactly correct.

Using Ham-Ms or Tailtwisters, I suggest using the natural south stop with the swing arm oriented about an inch away from the tower (antenna pointing south) and marking inside the control box to stop turning at 250° (as this should also be very close to the tower going the other way).

One advantage of using Ham-Ms or Tailtwisters is that they have such a low turning torque that you don't have to worry about someone turning the swing arm into the tower as there isn't enough torque to hurt the tower. If you use prop pitches, be careful as there isn't too much that will stop an energized prop pitch. I suggest making a model of scrap wood before cutting any metal to see on which side of the tower to put the rotator and which way to orient antennas, etc.

If you are using a prop pitch rotator, then I would eliminate the lower 3/8-in. plate and use the bearing plate from the prop pitch (bolt directly to the aluminum angle).