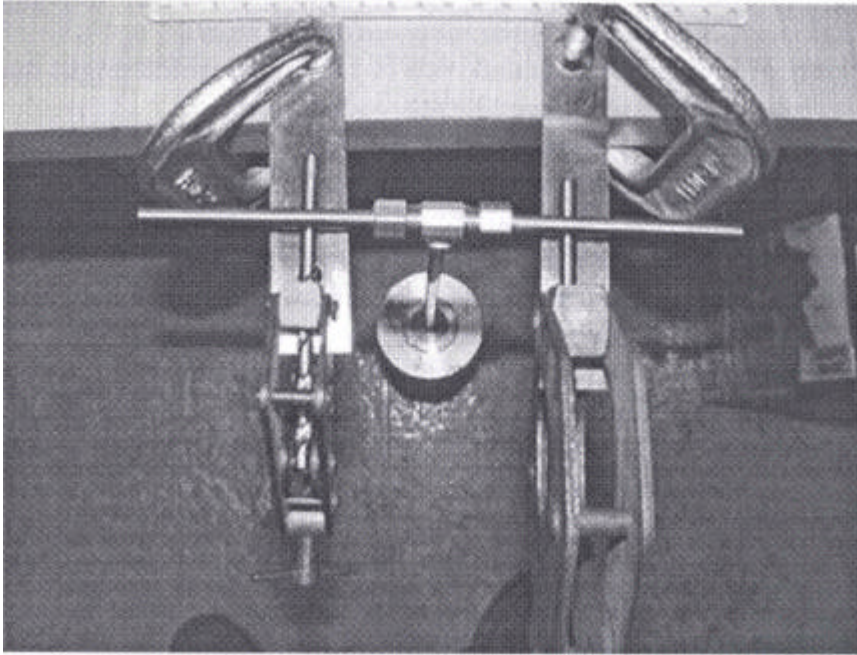


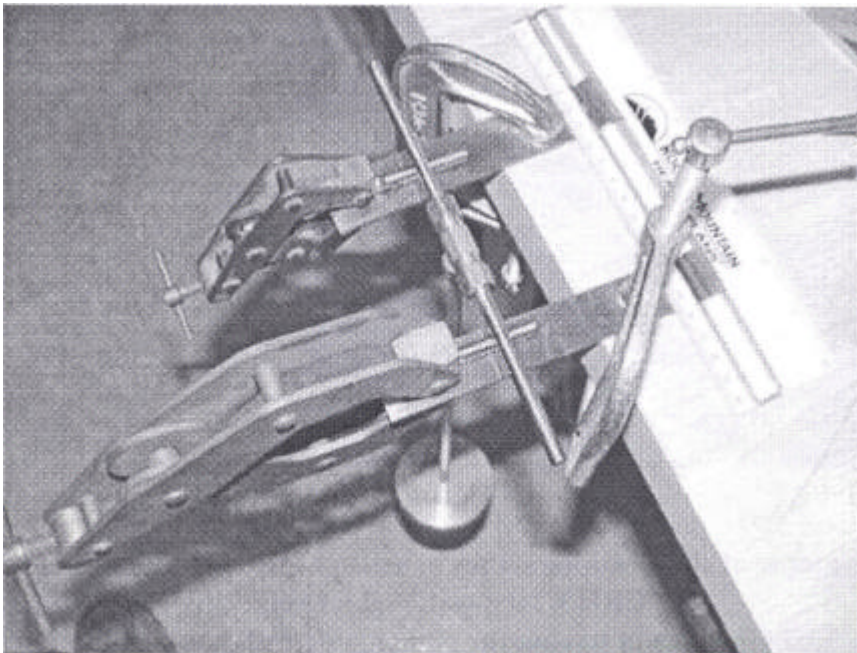
*(The following files OCR'd by Charles R. Patton from a printout on 10/24/2005 from: <http://home.earthlink.net/~meredithlamb/crossed-suspension.html> of a study by Meredith Lamb on crossed rod hinge suspensions)*

## Crossed Rod Hinge Suspension

The following two photos are only of the table top/edge test setup.



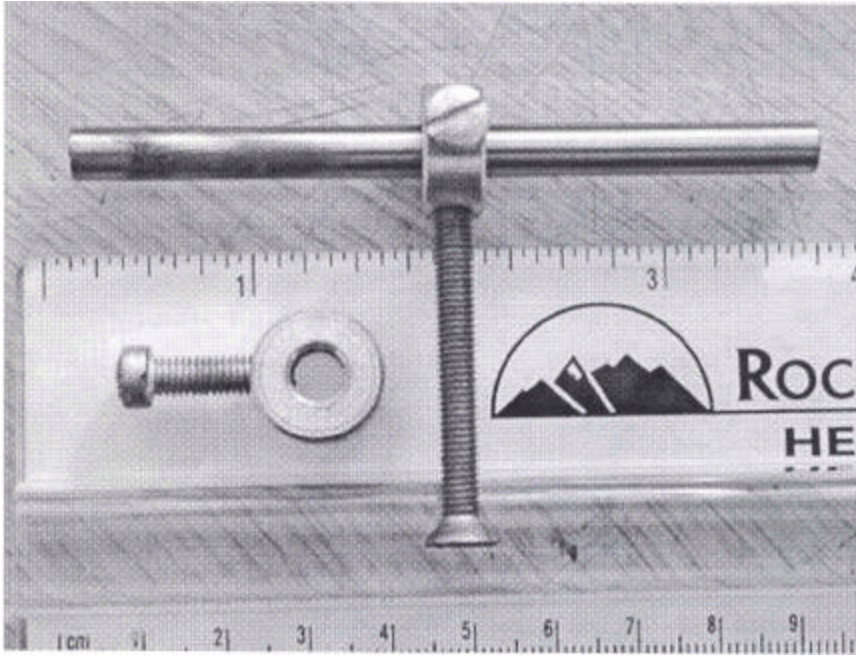
crhs1.jpg



crhs2.jpg

Oct 24th 2005: For those interested in either pursuing trying out the suspension, or, devising ways to reduce the size of the center rods and booms junctions; the photo below of a common shaft coupler afixed onto the center rod is rather a quick solution to consider. This particular shaft coupler has two setscrew threaded holes, but one would work also. One hole can be used for anchoring to the center cross rod, and

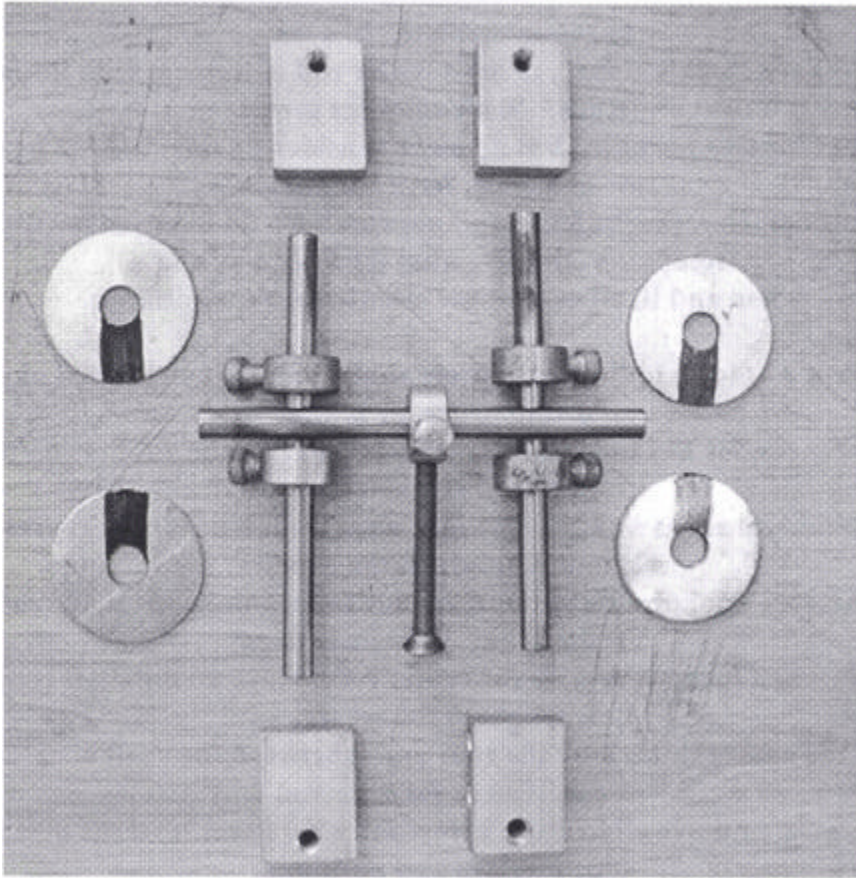
the other shows a long bolt example of the "boom". If you use hollow brass rods, it's quite possible to glue, or match the OD (outside diameter) of the bolt (of course cut off the bolt head prior to mounting). Quite a few hardware stores seem to have a variety of long brass threaded rods (~12"?) too, which might match the size of the shaft couplers threaded holes and likely the shaft couplers also if you want a "S-G" type setup. If you can do this, you're well on your way for a useful test setup, or toward a functional crossed rod hinge suspension. At this point, I'd not worry about whether the CRHS rods are magnetic or not, or even the shaft couplers, as most likely the eventual distance between that and any magnets that "might" be used for eddy current dampening, would be too far to really have much effect. In the photo below, the "center rod" is 1/4" in diameter, and the shaft coupler is 1/4" ID and 5/8"OD. Shaft couplers come in all kinds of sizes, regardless of the ID they serve.



crhs3.jpg

While we're on the topic of shaft couplers, they can also be used on the two outside rods of the CRHS, for positional locking of the center rod. I like the idea of having the two outside rods raised a bit, and having a shaft coupler (four) on each side of the center rod...however, I'd introduce two temporary shims on each side of the center rod. Once all the adjustments are met, then one can remove the shims, and the now vacant shim room space, then allows the center rod to rotate/oscillate. In a way, the shaft couplers are "safety stops", to limit center rod movement with initial instrument setups. Shaft couplers aren't absolutely necessary for this purpose...but if you're considering this hinge to be mounted on the side of a mast, for a horizontal or vertical seismometer, the "safety stop" approach would likely be helpful on initial setups...or...maintaining the fixed position when and if, other changes elsewhere are made later.

The photo below is of a "blown up" layout, where shaft could be entertained as use as positional maintenance, or initial setup position references, for any hinge, or of course a "S-G". The washers on the right/left, are felt tipped marked where they could be cutout, to act as a shim. The four aluminum blocks only represent a upright standoff, to which the outside rods would be inserted into; or affixed too. Let's say for example this is all ready to go and is together. Say, your instrument "wants" a position a half inch lower with the center rod. Move all the shaft couplers and shims down, tighten the set screws or bolts. Remove the cutout shims over the rods and in between the shaft coupler and the center rod. Check for rotation, and either leave as is, or move all items as before for where ever it works best for you. This type of hinge and positional adjustment layout is what I'm considering for converting my old large S-G's into. Not shown, but likely necessary is limiting (but not interfering with) the position of the center rod to the left and right. Perhaps just a felt tip mark on a surface underneath is good enough. It all takes a bit of work; but its not very complicated either. All sizes can be enlarged or reduced for whatever size of rods you use.



crhs4.jpg