

Fabrication of a Collapsible Steering Column

By Allan C. Miller, Jr.

In February I drove a 2010 Toyota compact head-on into a truck tractor parked in the slow lane of Jamaica's only limited access highway. Even at moderate speed (30-35 mph), the front end was pushed back to my ankles. Thanks to modern 'progressive failure' technology, I walked from the crash with shoulder and lap belt burns and chest bruises from caving in the collapsible steering column.

As soon as I walked off the plane, I began designing a collapsible column for my 100M racecar, a project that had been in the left brain phase for two years, but never got off the sketch pad. A week later I finished CAD plans and perspective renderings, sourced parts, and took a BJ8 high ratio (12:1) box to Don Breslauer in Connecticut, a noted custom fabricator with extensive racing team experience. He tweaked the design and worked out the fabrication issues. The next day later I took home a ready-to-mount box.

Even with the prototype, my savings were 60-70% over the costs of sending a box to England for conversion, given shipping and the currency conversions.

Here is a parts list of Borgeson materials needed to complete a box conversion.

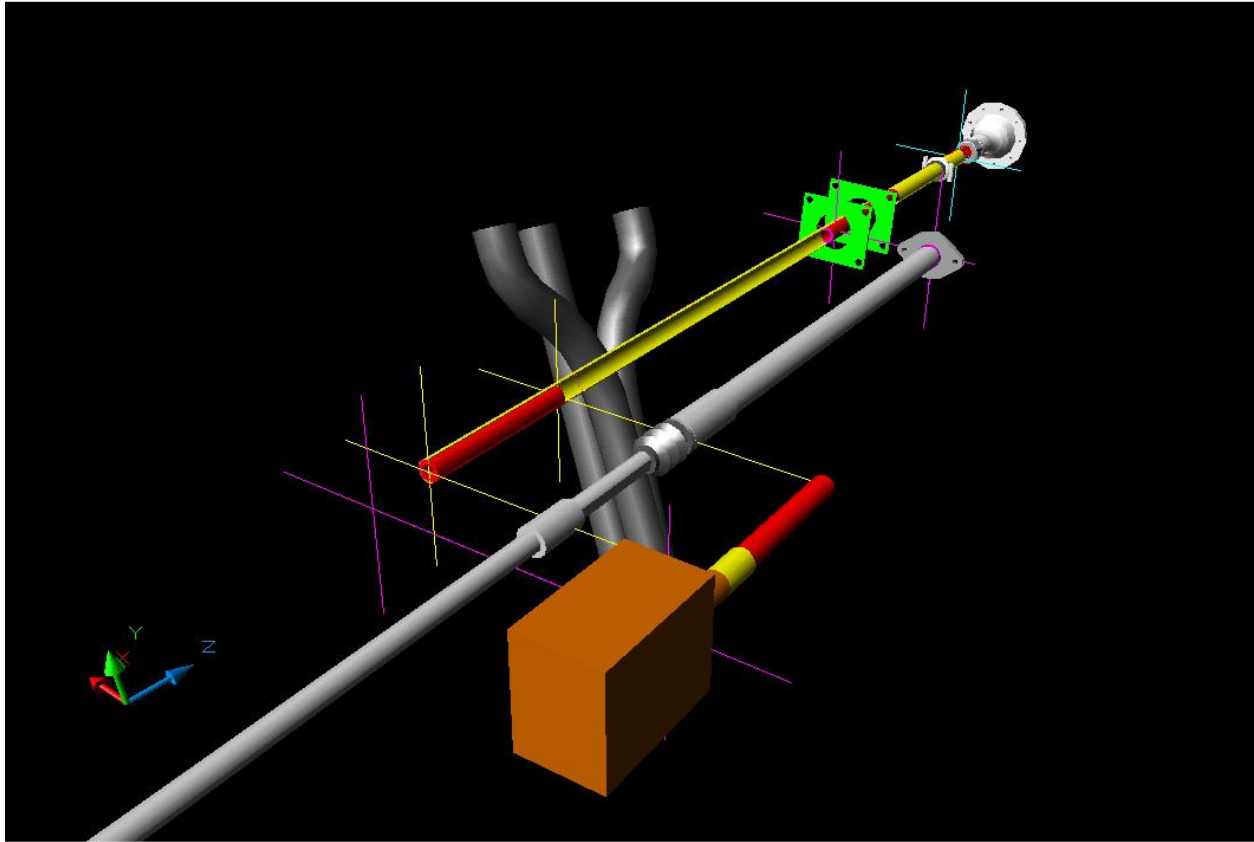
450036 36" Extended Length \$78.92 1 \$78.92
700010 Firewall Flange Bearing, 3/4" ID \$29.00 1 \$29.00
314900 3/4DD X 3/4 Smooth Bore \$20.52 1 \$20.52
315200 1DD X 1-1/4 Smooth Bore \$28.13 1 \$28.13
Subtotal: \$156.57
Shipping cost: \$17.26 (UPS ground to new york from ct)

Total: \$173.83

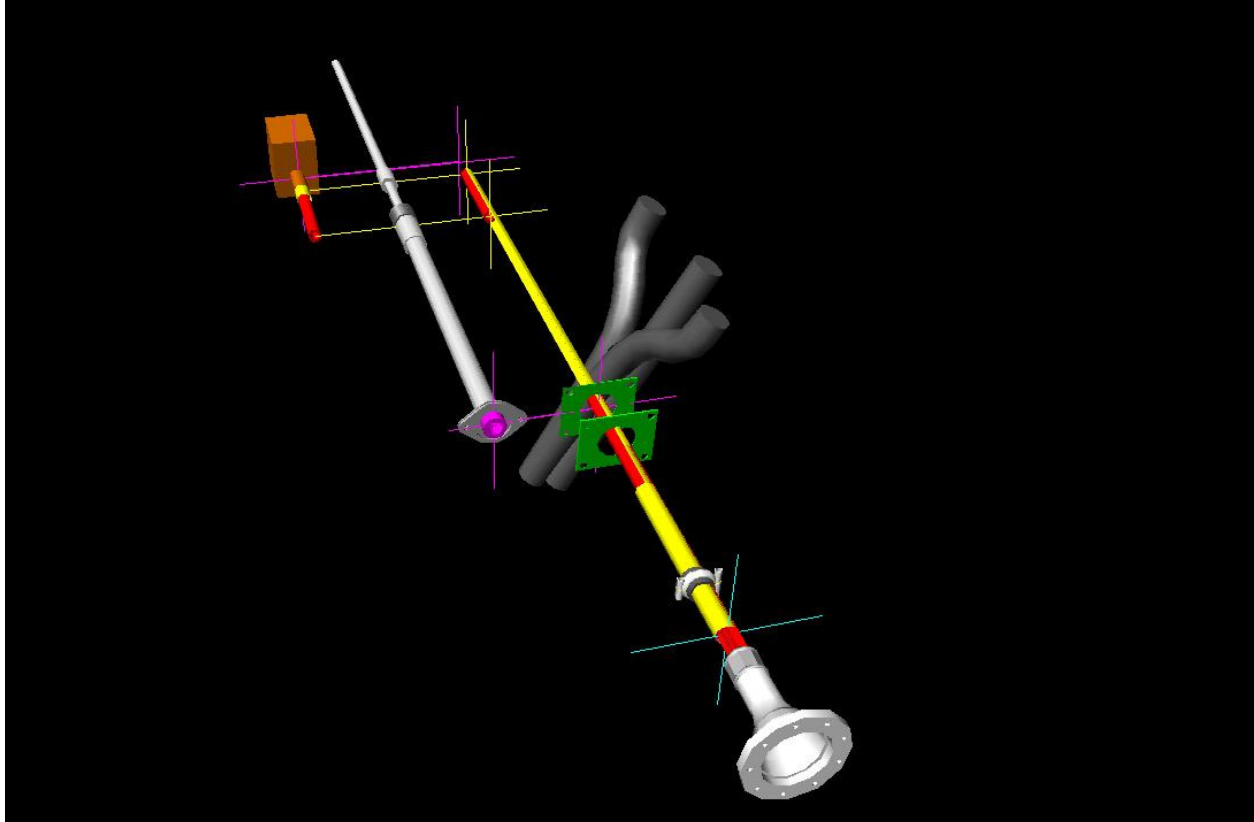
If anyone is interested I can put them in touch with Don Breslaus who fabricated the prototype at very reasonable cost and whose work is impeccable (he has 30 years' sports racing support experience) and is incredibly proficient

I can be reached at Allen100m@Yahoo.com

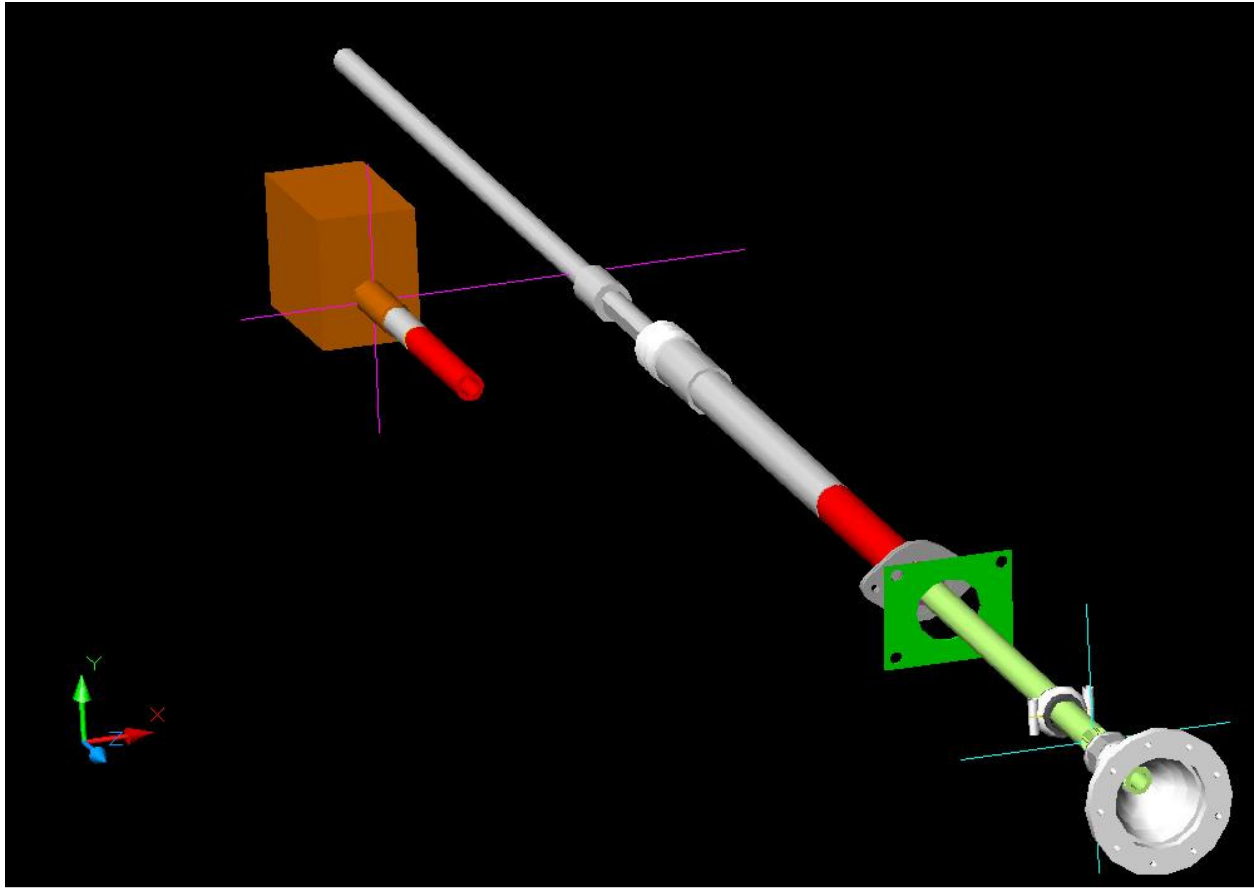
CAD renderings are on the following pages.



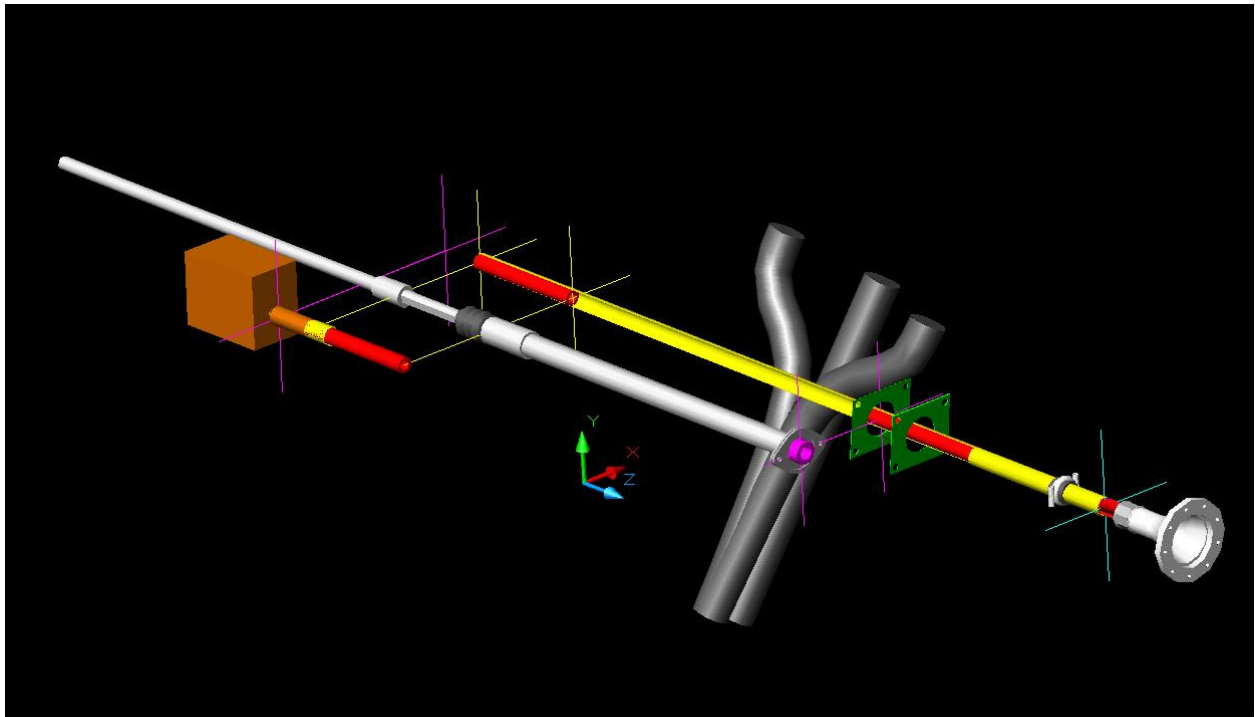
Perspective view from box end before cutting. Note alignment between the Borgeson swivel and the Healey firewall plate. New shaft is too long



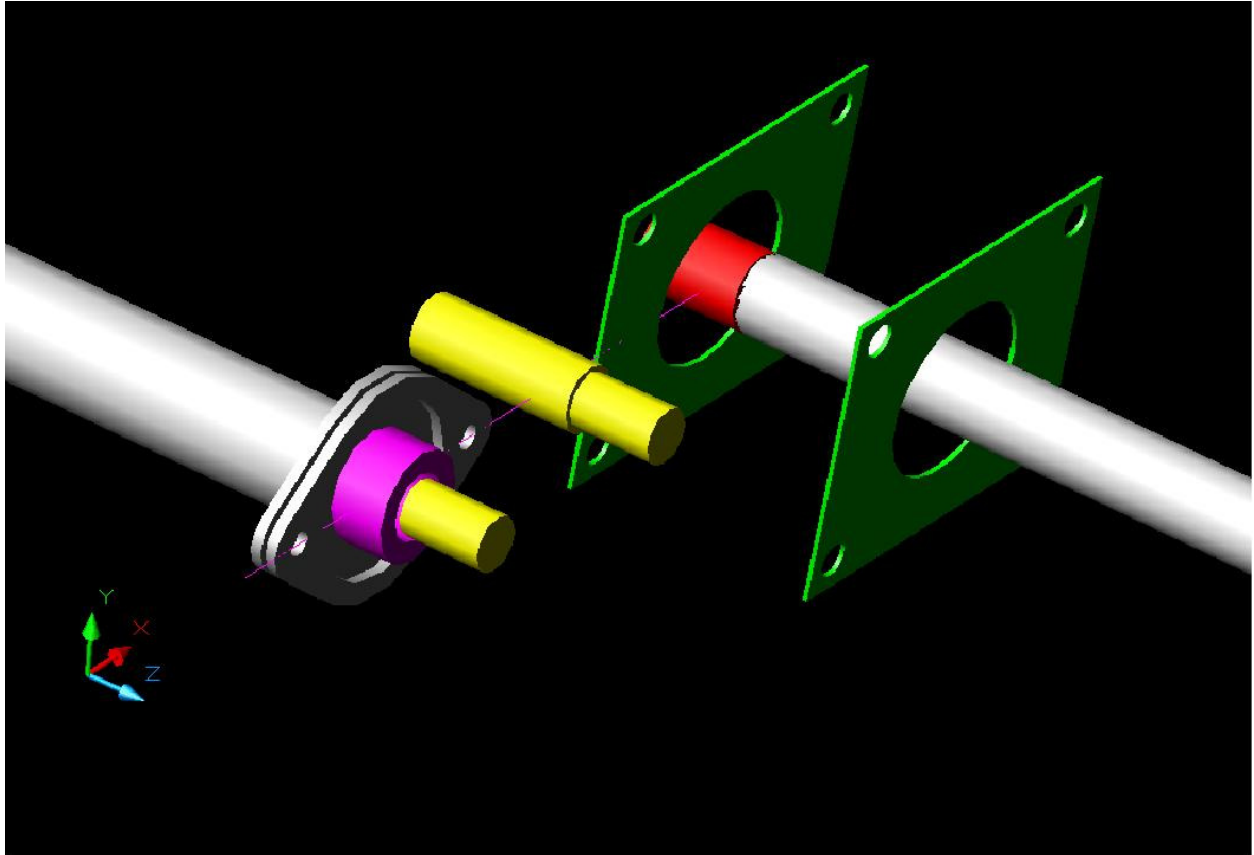
Perspective from over hub end. Note location of headers, which need to be distanced from the rubber boot of the Borgeson collapsible shaft (which will be closer when cut to length).



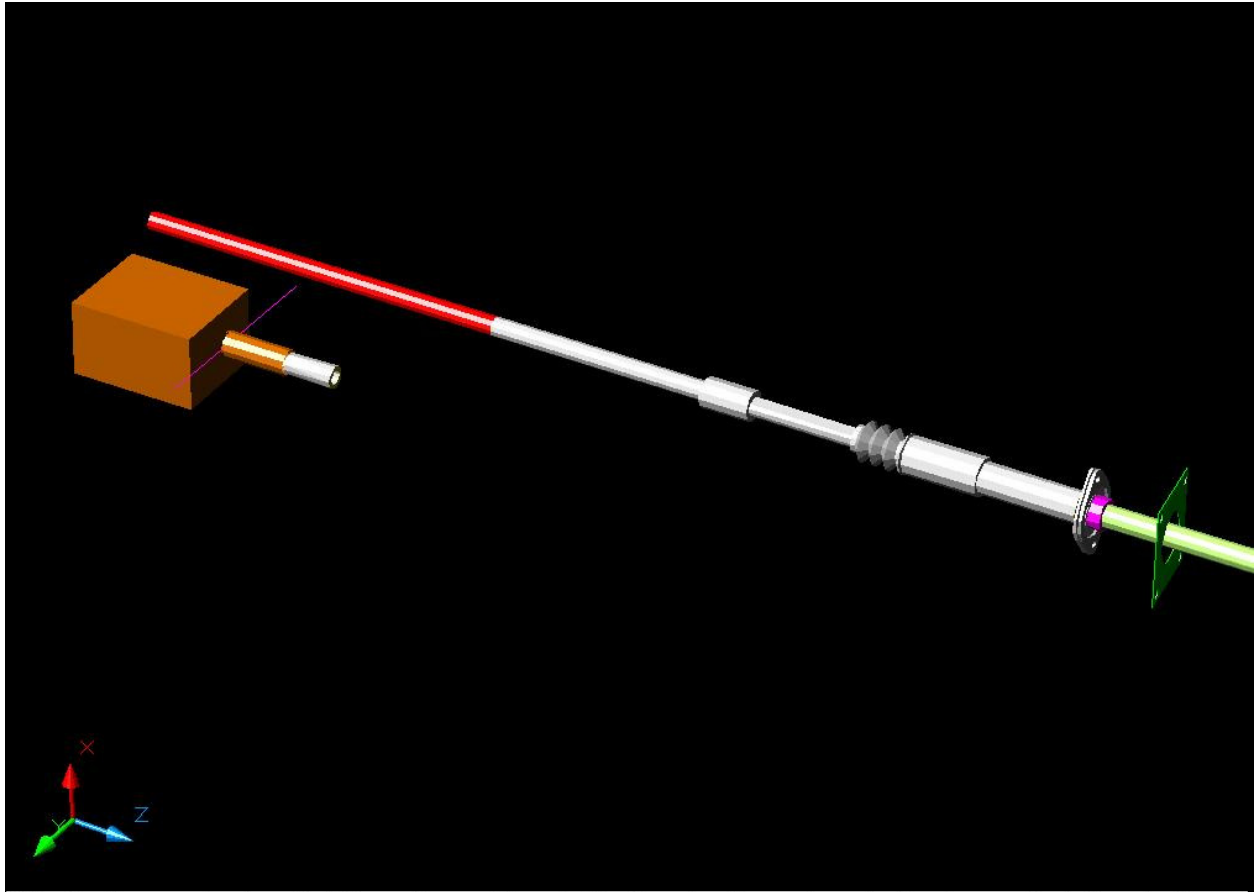
Trim 5.1 inches off the shaft section protruding from the box. The 1.25" tube gets pre-trimmed 7.6" (leaving about 1/8" to 1/4" to remove and polish when the whole assembly is fitted to the car, so that it bears against the swivel bushing freely but firmly).



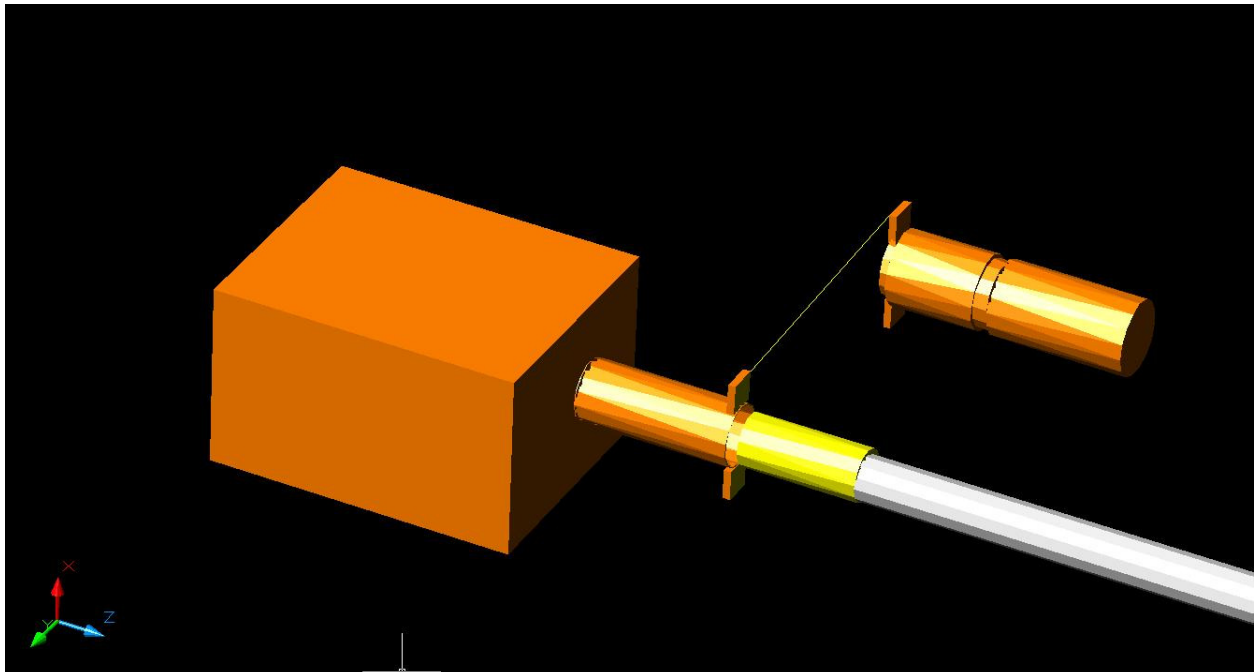
Intent is to shorten the 1.25" round tube welded to the 1DD-1smooth coupling, so that it's firewall end is positioned against the swivel plate bushing and the collapsible column component fits at the far end of the steering shaft section



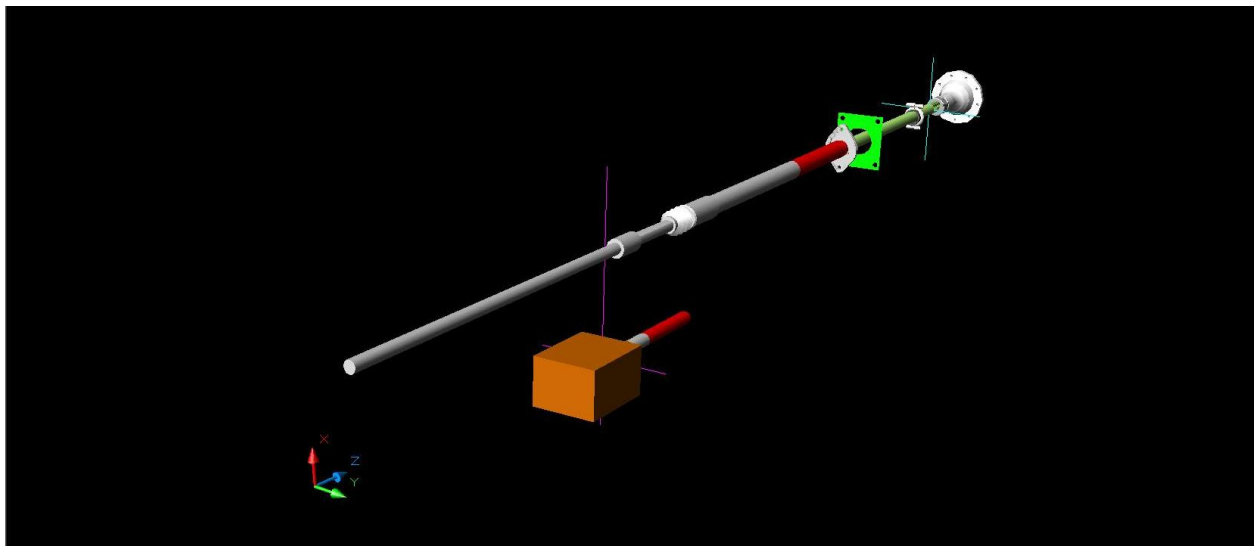
Fabricate 3" adapter (yellow), 2" x 0.75" to fit swivel and 1" x 0.56"+/- to fit inside of the Healey column. Cut off 1.25" plus allowance for welds off the column (red).



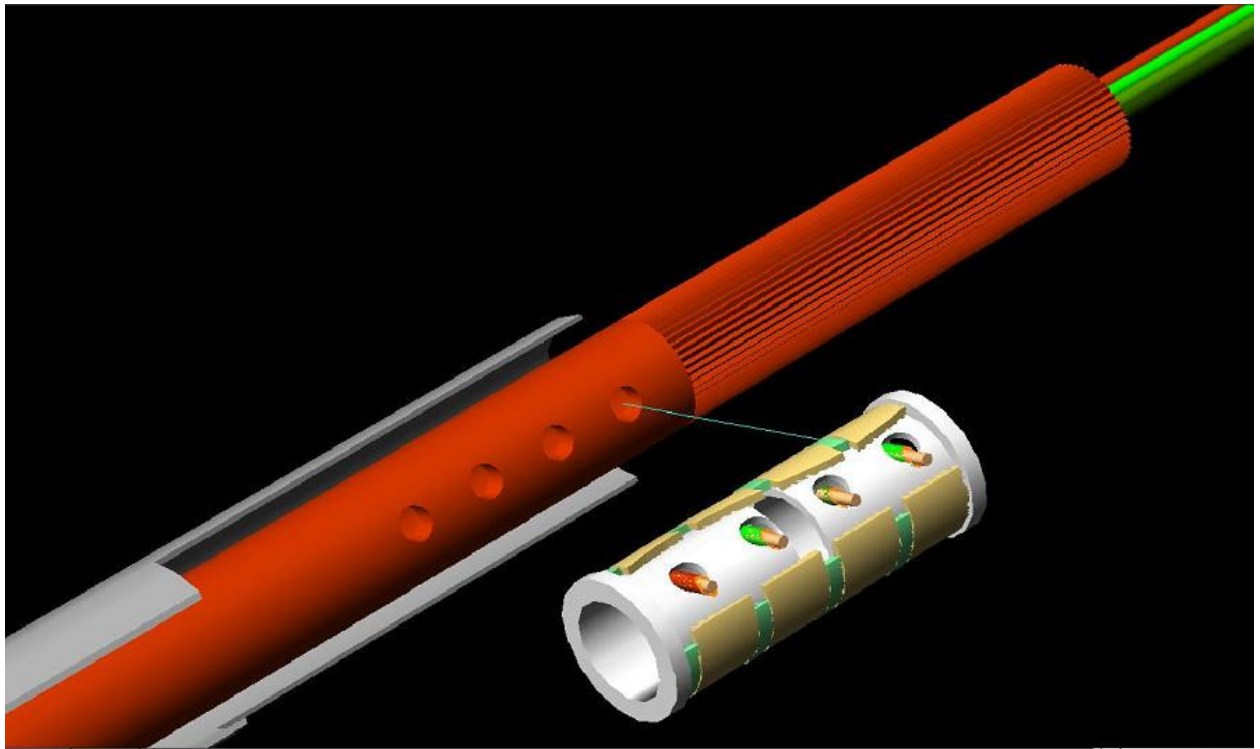
Trim the box casing to ~ 2.5" from the weld, and trim the steering column in the box so that it projects 2.25" proud of the casing (allows for stock fiber packing). Trim about off the 3/4" DOM tube welded to the 3/4DD-3/4smooth Borgeson coupling so that the overall distance box to firewall is ~32".



cut off the top of the second column casing at about 4" and fashion an oil seal using stock felts and the second casing piece. weld ears to hold down. Healey boxes use heavy gear lube oil.



Perspective detail of cuts



schematic of nylon and bronze bushing trafficator pickups