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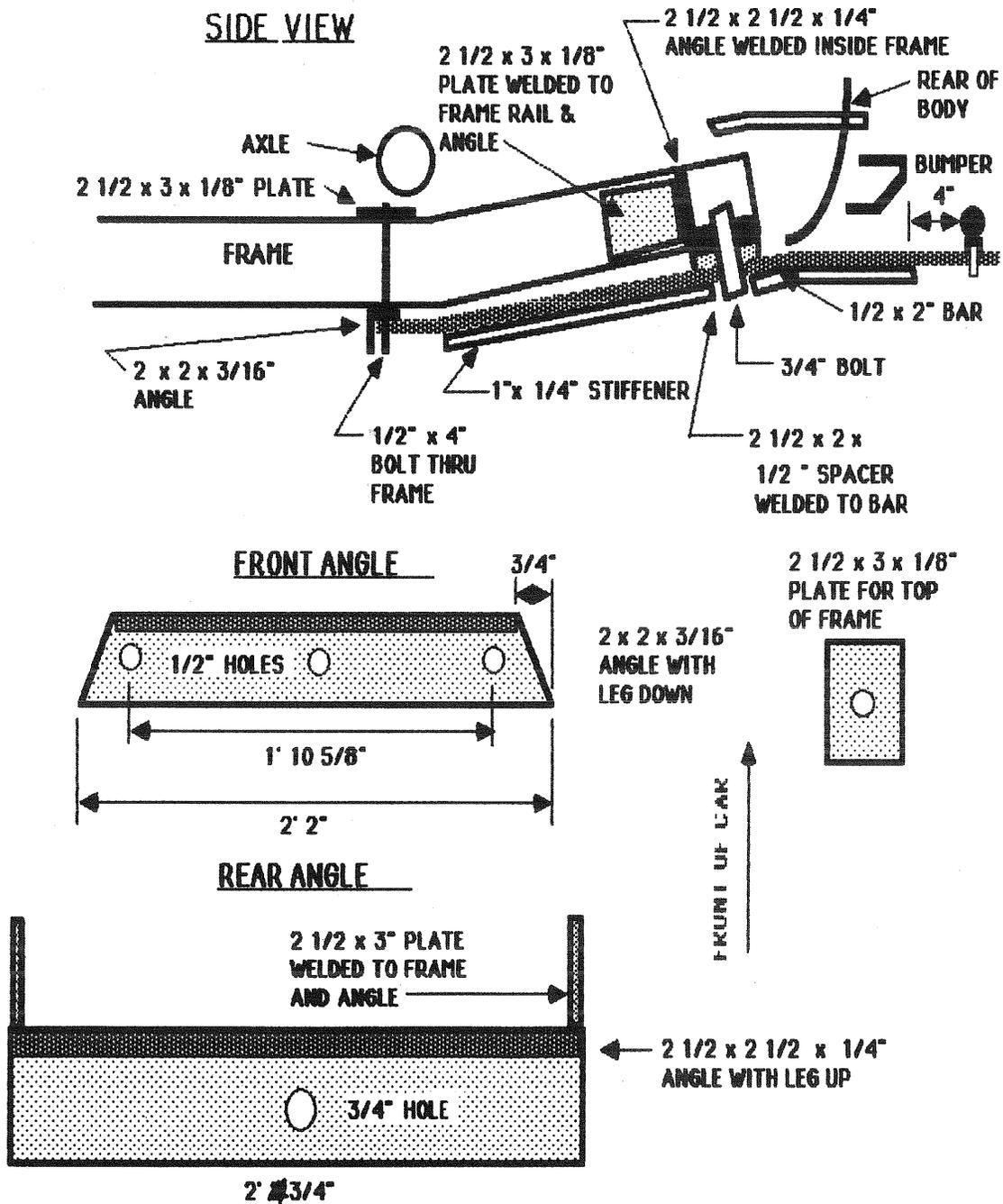
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# REMOVEABLE AND OUT OF SIGHT TOW HITCHES FOR THE TR 6

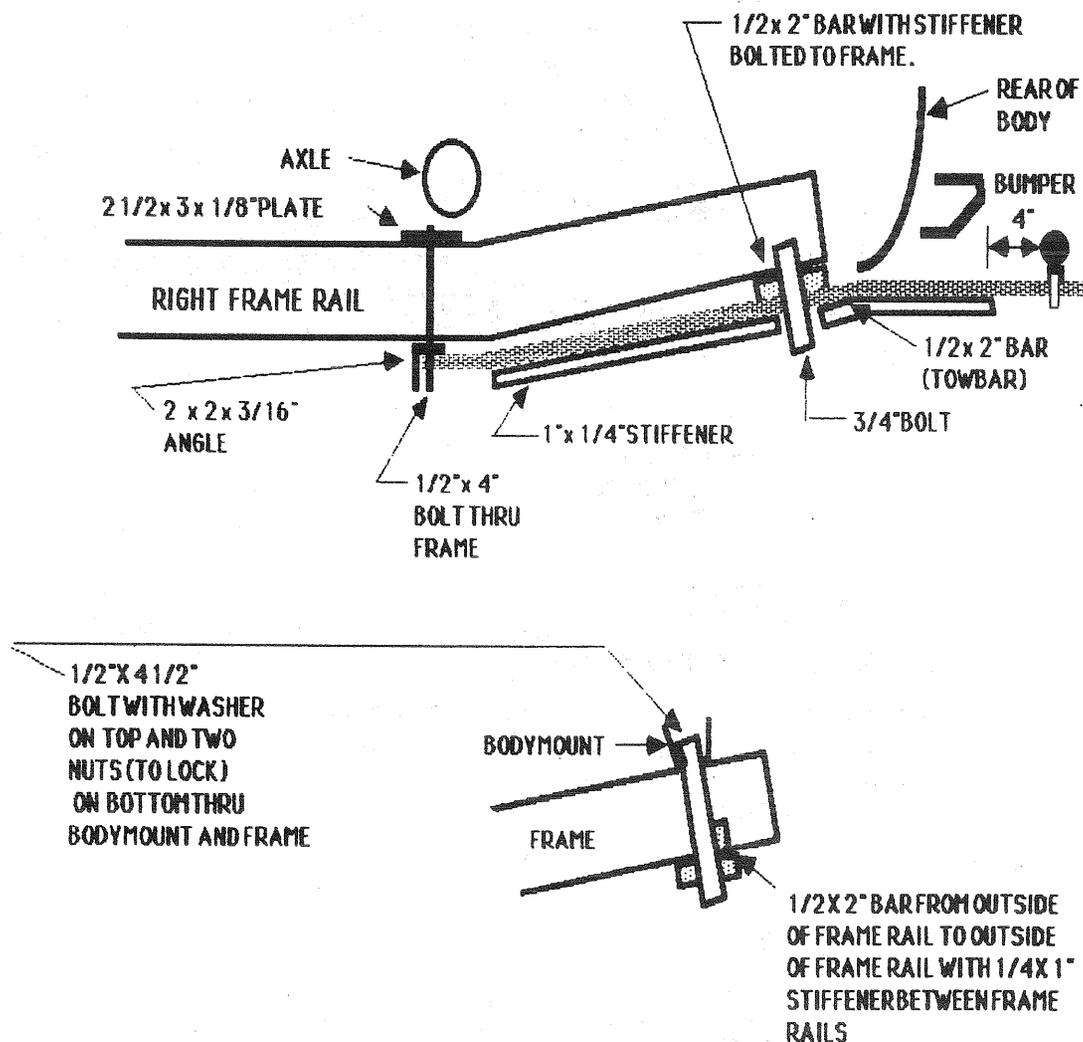
Skill Level B

As the 6 PACK national meets spread farther from the East and Midwest and the trips get longer, a little trailer for spares and silly things like clothes would come in handy. And, in general, there are many times when most of us would like to have a hitch to tow something. These are set ups I have used for hitches. Due to extreme differences in workmanship, etc., they are presented for information only and are to be used at your own risk. See the disclaimer in SIX TECH.



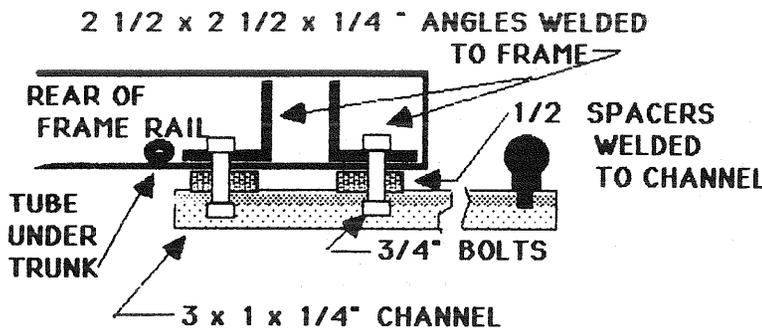
I have this set up on a car with a Monza exhaust but it should work on any car and should clear the stock muffler. I don't have a car with a stock exhaust to check it out but, at worst, it would require more spacers welded to the main member to lower it. However, there are many kinds of exhaust systems. If I were to make a light duty, no welding(almost), removable variation I would substitute a 1/2" x 2" bar with a 1" x 1/4" stiffener on top in lieu of the angle welded to the frame. This could be bolted to the rear of the frame utilizing the holes near the back of the frame rails with stiffener plates inside the frame rails or with bolts thru the body mounts as shown.

VARIATION OF THE ABOVE



I must emphasize that the above and the following are used for towing with a tow bar or a light load trailer, none is meant to take an appreciable tongue load.

## ALTERNATE 1

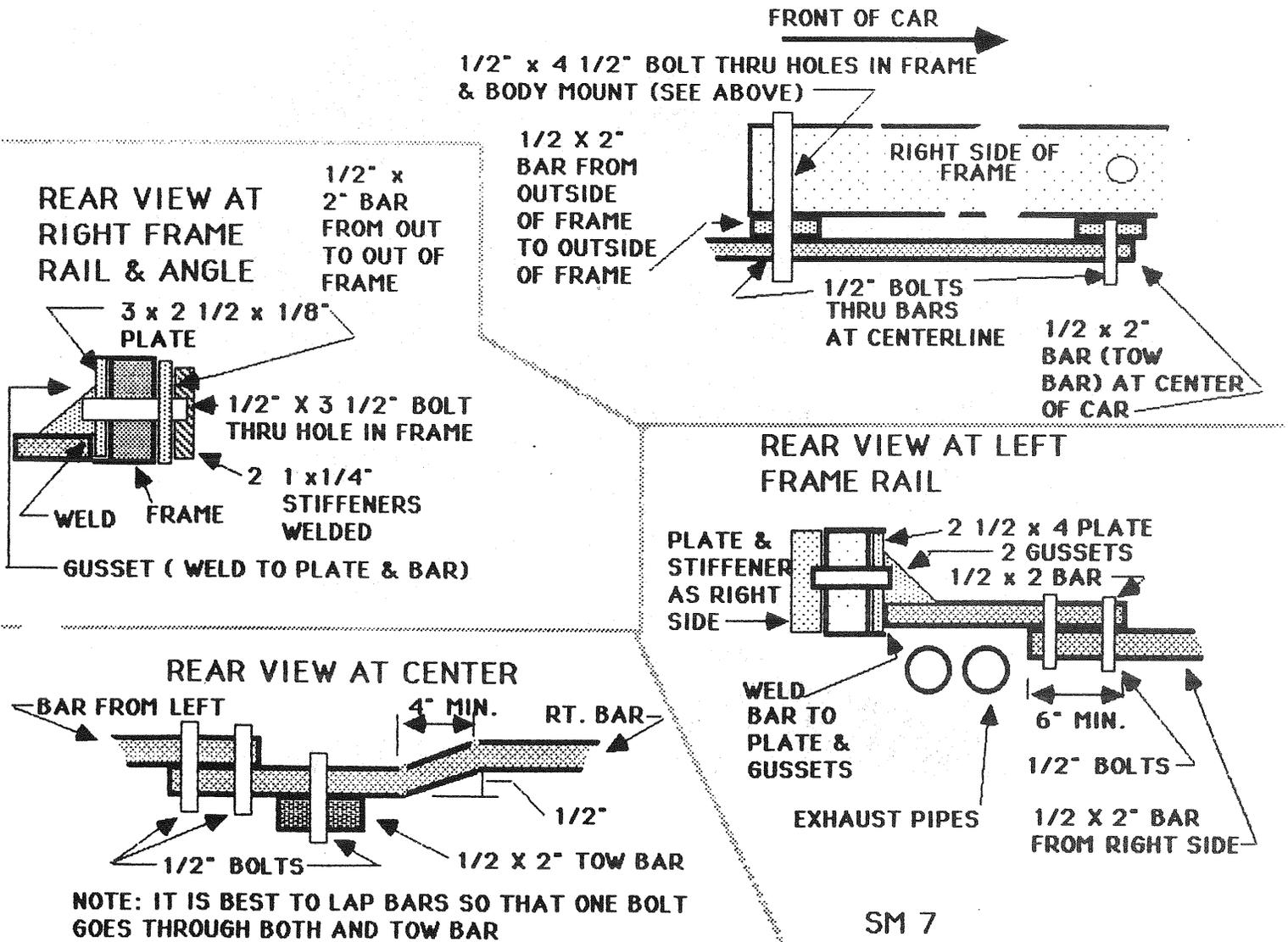


NOTE: FRAME SLOPES UP.  
CHANNEL MUST BE CUT AND  
LEVELED AT ABOUT REAR OF BODY

I have used this set up for years, once towing a Chevy wagon with it (the Chevy steered the TR and had to have a driver aboard). The angles are as far apart as possible. A plate between the vertical legs of the angles makes it rigid and the vertical weld was easier on thicker metal. The 3/4" nuts are welded on the top of the angles before installing. The frame is the weakest part of this set up.

## ALTERNATE 2

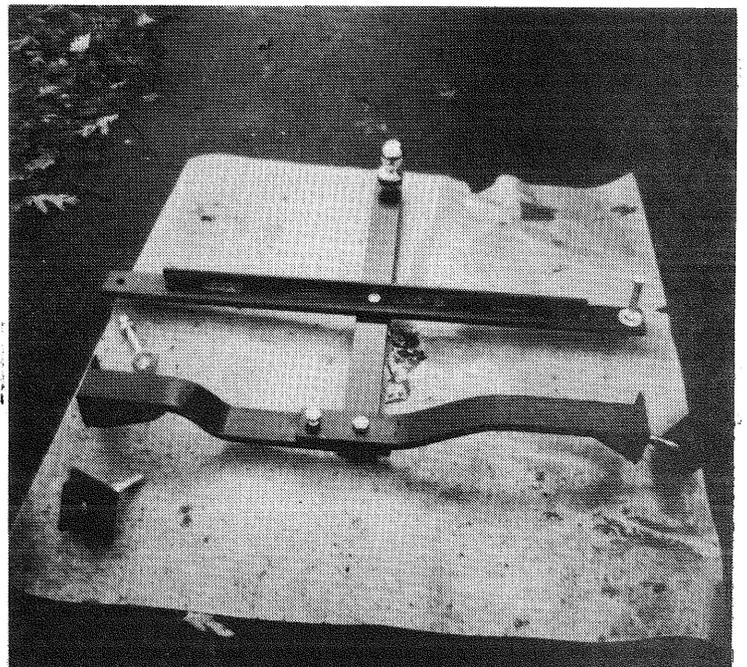
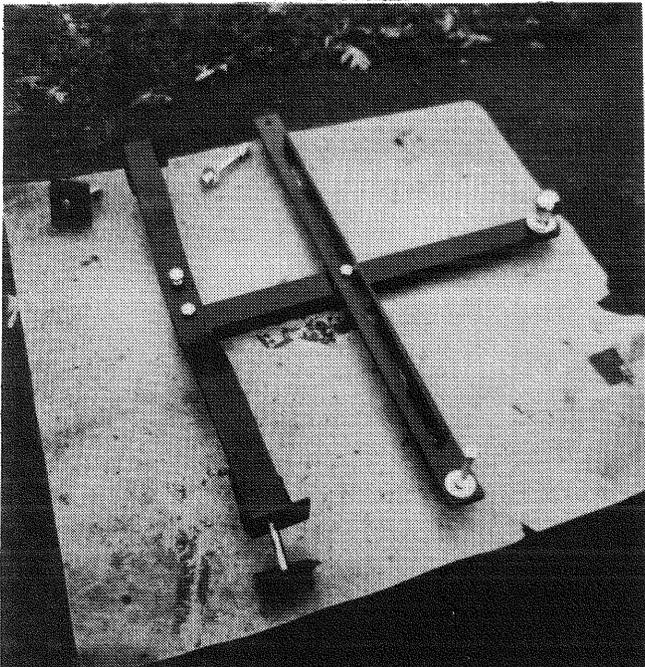
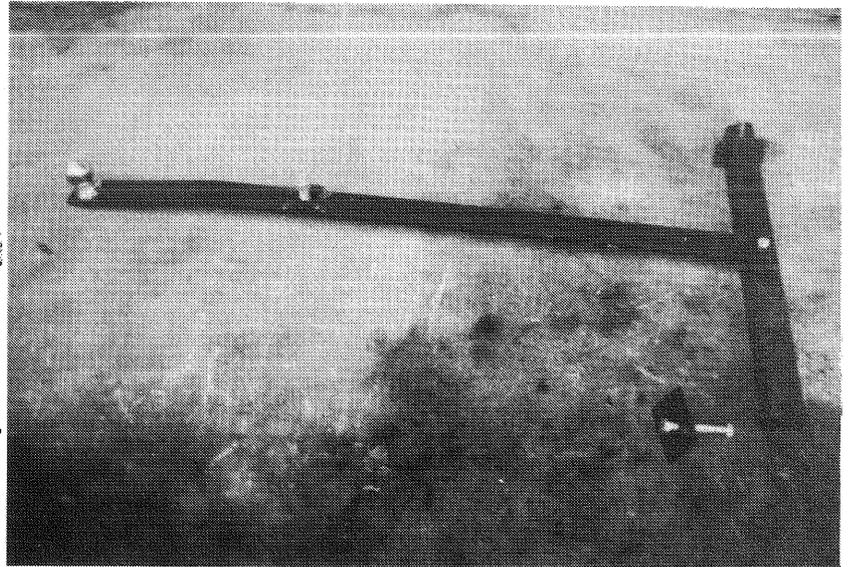
### RIGHT SIDE VIEW



I think the drawing for Alternate 1 is pretty much understandable so I haven't added any photos. Alternate 2 could be used on a show car since it totally removes. The dimensions shown for the plates and 1/2" x 2" bar at the frame rails may be considerably different for different cars due to the close proximity of the hole in the frame, the mufflers used, and the tube under the trunk. The drawing is pretty hard to follow so I hope the photos help. The one shown is on my 4 Place TR 6 which has a Thrush muffler on the right side passing under it so the plates and gussets at the ends are upside down from the drawing

Shown at right is the hitch on SM 5. In this case, the angle welded at the rear of the frame was used so the 1/2" x 2" bar used in the variation on SM 6 is not shown.

Alternate 2 shown below.



## BOLT TYPES AND TORQUE

Bolts aren't just bolts. Those mail order "storehouses" you see with a zillion bolts (most too small to be of any use) for ten bucks are fine for putting on your license plates but don't use them on stressed parts of your car. There are 3 basic types of steel used for bolts and their strength varies considerably. Grade 2 have a tensile strength of 74,000 pounds per square inch (PSI) of cross-sectional area; grade 5, 120,000 PSI; grade 8, 150,000 PSI. Look for the markings shown below on the head. British markings are different. For virtually all applications on your TR 6 grade 5 will do, but if you are not reusing the original bolt, it won't hurt to use grade 8. Internal engine bolts are a whole different bag, use only factory replacements. The following torques are for fine (SAE) threads with SAE 10 oil or an equivalent lubricant on the threads. UNF and SAE are supposed to be the same but you should refer to your shop manual whenever possible because the torques listed (for UNF) are 10 to 15% lower. Torques in foot pounds (ft./lbs.)

Bolt Size	Grade 2 	Grade 5 	Grade 8 
1/4"	6	10	14
5/16"	12	19	29
3/8"	20	33	47
7/16"	32	54	78
1/2"	47	78	119
9/16"	69	114	
5/8"	96	150	
3/4"	150		

## BEARINGS ARE BEARINGS

Contrary to popular belief bearings are not made to fit cars - exactly the opposite. When a manufacturer (even General Motors) designs an axle or a pump or a space capsule they must design it around generic bearings, seals, and bushings. Now this is not as difficult as it sounds since there are many types and thousands of sizes. The point is you can get the bearings or seals you need right there in River City should the need come up unexpectedly or if you don't want to wait for mail order. Sometimes you can even improve on the original. For example some ball bearings are made with built in seals on one side or both sides. If you have an application where chronic leakage occurs through the bearing area (such as early TR-3 or MGT Series rear hubs) simply use a sealed bearing in addition to a modern seal. It is a good practice to measure any bearing you remove and record the size, make, and part number (these interchange). I put them in the applicable section of the shop manual. Then, when a job comes up unexpectedly or you want to get the parts before tearing the car down, just take the numbers to an industrial bearing supplier listed in the yellow pages.

## A BETTER SEAL IS NOT NECESSARILY A BETTER SEAL

I've basically always been a believer in overkill and using better materials than necessary. For example, using a needle roller bearing in lieu of a brass bushing or a double lip seal in place of a single lip or even, as in TR-6 front wheels, replacing the felt seals carried forth from horse drawn vehicle design. I'm not alone in this. Design engineers have always assumed double seals were better.

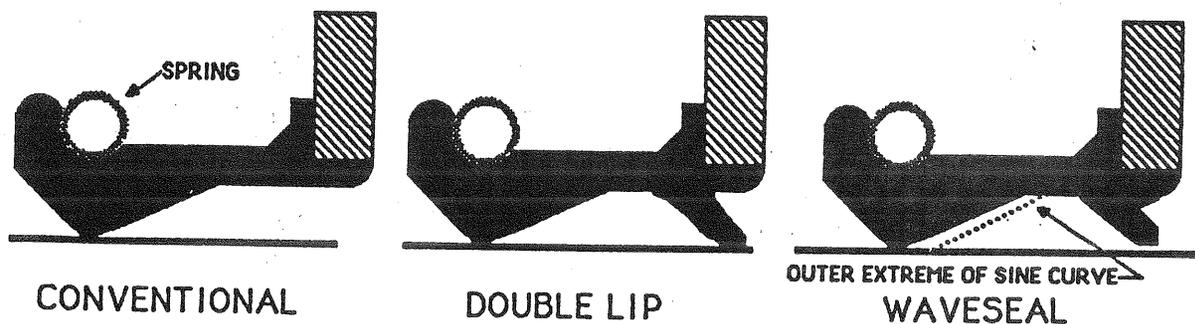
An interesting technical report by CR Industries blows this theory all to hell. Since it is not likely to grab your attention like a Playboy centerfold, I'll give you the meat of it.

In a dual lip seal, the spring loaded primary (inner) lip seals the oil in while the secondary non-spring loaded lip seals out dirt and dust. That certainly seems logical. CR's intensive

research shows that is not at all so. Heat is the enemy with seal materials, such as nitrile, causing hardening in the presence of oil. At 3000 RPM, (60 MPH in a non-overdrive TR 6) shaft temperature due to friction of the secondary seal was 145° vs. 63° for a single lip seal. Packing the dual lip seal with grease had no significant effect. Removing the secondary lip dropped the temperature of a dual lip seal from 145° to 60. What is more, temperature increases directly as RPM increases. As to dust and dirt ingestion, at the start the single lip seal lets in more dust but at 100-150 hours the two seals are equal. At 150 hours the ingestion by the dual lip seal increases dramatically. At 300 hours the dual lip was trapping and ingesting over twice the dirt of the single lip. In all cases failure was due to dirt lifting the primary lip, not due to lip wear.

### WAVESEAL, THE WAVE OF THE FUTURE

If you stayed awake through the above, you'll find the following earthshaking. After several million hours of testing CR Industries has introduced Waveseal. Two things make it better. First, the primary sealing lip has a sine curve (the mathematical name of a smooth curve which swings smoothly from one side to the other, alternately and equally on both sides of a line). That means it contacts more shaft surface to dissipate heat (the curved edge is longer than a straight edge). The in and out curved edge "pumps" dirt away and oil back in at the sealing edge. The double lip variety has a secondary dust shield which does not actually touch the shaft so you do not get the destructive heat build up encountered with normal double lip seals.



## THAT OLD FROZEN BEARING TRICK

Few of us have the luxury of owning a hydraulic press and bearing pullers to remove and install bearings. Given that you're willing to spend a little time and think ahead there is a way to beat this problem - at least the installation problem. Usually, when you are removing a bearing it is bad so it doesn't matter if you beat on the outer race. However, doing this to install a new bearing is a no-no because it damages the bearing.

Simply place the new bearing in the freezer of your refrigerator overnight. That will shrink it enough so that it will go into the bore of the part with little or no tapping on the inner race. Use a lead or copper hammer, never steel. In the opposite case- installing a bearing on a shaft - put the shaft in the freezer overnight. Think ahead and have a piece of pipe the correct size to fit against the appropriate installing race of the bearing. Pound on this pipe, not on the race or side to side on the race.

## ANTI-SEIZE AND LOC-TITE

These are two items I find invaluable in the shop and virtually nobody ever remembers to buy. Anti-seize should be used on virtually all non-moving connections where excessive corrosion occurs. Examples are thermostat housing bolts, crankshaft pulley, tiny bolts, frame brace on TRs which must be removed to pull the engine, differential mounts on TRs with independent rear suspension, and any steel bolt in an aluminum part (this is especially important). Loc-tite, on the other hand, should be used on parts subject to moving, and especially those subject to loading and unloading (like connecting rod and wrist pin bolts) and all internal engine bolts. A few drops of the type used for bolts placed on front wheel spindles keeps the wheel bearing inner races from spinning. However, in virtually all of the above cases you should not overdo it and use bearing-lock because you'll never get the pieces apart again. With both products the surfaces should be clean and free of rust and oil.

## CONVENIENT RUST REMOVER

Frequently you remove a bolt with the threads half full of rust and you can't find one like it in your bolt can. Or, you have a small piece of rusty sheet metal that you want to paint. Even if you want to clean surface rust off a fender, there is a product which will save you a trip to the metal stripper or the hardware store.

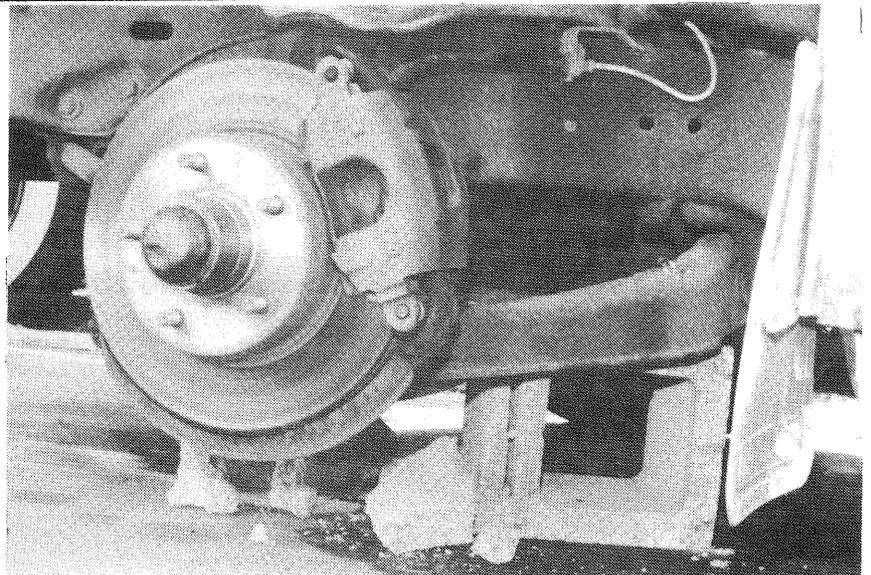
Muriatic acid is available at most hardware stores for about \$5.00 a gallon. Its principal use is for cleaning masonry. However, it works great on steel. Simply put some in a plastic container and drop in your part. Clean or chip off all scaled rust first. Swishing the acid about speeds up the process, but you only need to let it set until the rust is gone.

Now the bad part. Muriatic acid, like any concentrated acid, will burn skin and puts off heavy, choking fumes which tend to not disipate quickly. Be sure to use it in an open area and hold your breath when near the container. Also use away from other metal parts so the fumes don't clean them. I once used some in the doorway of the garage for about an hour. The next day I found a lot of parts had been cleaned (which I didn't want cleaned) by the fumes and immediately attacked by summer humidity.

**CAUTION:** I've been told the acid causes an embrittlement action with some steels. Do not use on stressed parts like suspension.

## NEVER USE CEMENT BLOCKS UNDER A CAR

The front suspension of this Detroitus Gigantus sat on this block just fine - for a while - about long enough for someone to have crawled under the car!



CAR	TR 6
OIL_CHANGED	
OIL_BRAND_TYPE	
OIL_FILTER_CHANGED	
OIL_FILTER_BRAND_NO	
TUNE_UP	
PLUG_MAKE_TYPE	
PLUGS_NEW	
AIR_FILTER_CHANGED	
AIR_FILTER_MAKE_NO	
TRANS_OIL_CHANGED	
TRANS_OIL_BRAND_TYPE	
REAR_END_OIL_CHANGED	
REAR_OIL_BRAND_TYPE	
LUBED	
WHEEL_BEARINGS_PACKED	
FRONT_BRAKES_NEW	
REAR_BRAKES_NEW	
FR_BRAKES_MAKE_NO	
REAR_BRAKES_MAKE_NO	
BRAKES_ADJUSTED	
BRAKE_FLUID_NEW	
BRAKE_FLUID_TYPE	
FR_SUSP_UPPER_BUSHING	
FR_SUSP_LOWER_BUSHING	
CARBS_REBUILT	
CARB_DIAPHRAGMS	
FUEL_PUMP_REBUILT	
ANTIFREEZE_NEW	
FREEZE_DEGREES_F	
WORK_REQUIRED	
PARTS_REQUIRED	
NOTE_#1	
NOTE_#2	
NOTE_#3	
NOTE_#4	

## MAINTENANCE CHARTS

If you are like me, you can't remember when you did what to which car. The charts on this and the following page will help. The second is more detailed and will help you if you are the type that rebuilds or replaces parts near the end of their expected service life instead of waiting until they fail. This is a good practice to follow. As more of us drive greater distances to the 6 PACK TRIALS this becomes more important. It is a lot easier to replace a water pump, a universal joint, or most any other part at home than on the road. For you computer types that wish to customize a chart, this was done on Reflex database.

CAR	TR 6	ENGINE REBUILT	
OIL CHANGED		MAIN BEARINGS	
OIL BRAND TYPE		ROD BEARINGS	
OIL FILTER NEW		THRUST WASHERS	
FILTER MAKE NO		CLUTCH NEW	
TUNE UP		VALVE JOB	
PLUG MAKE TYPE		DISTRIBUTOR REBUILT	
PLUGS NEW		POINTS NEW	
AIR FILTER NEW		CONDENSER NEW	
FILTER MAKE NO		IGNITION WIRES NEW	
TRANS OIL NEW		WATER HOSES NEW	
OIL BRAND TYPE		FAN BELTS NEW	
DIFF OIL NEW		FUEL PUMP REBUILT	
OIL BRAND TYPE		CARBS REBUILT	
LUBED		CARB DIAPHRAGMS	
STEERING OILED		EXHAUST SYSTEM	
FR WH BRGS PACK		TIRES NEW	
FR BRAKES NEW		TIRES ROTATED	
RR BRAKES NEW		TIRES TYPE SIZE	
FR BR MAKE NO		SPRINGS SWITCHED L TO R	
RR BR MAKE NO		FRONT BALL JOINTS	
BRAKES ADJUSTED		F SUSP UPPER INNER BUSH	
BRAKE FLUID NEW		F SUSP LOW OUT BUSH	
BRAKE FLUID TYPE		F SUSP LOW IN BUSH	
FREEZE DEGREES F		STEERING RACK REBUILT	
ANTIFREEZE NEW		STEERING RACK GAITERS	
WORK REQUIRED		RR AXLE LT INNER U JOINT	
WORK CONTINUED		RR AXLE LT OUTER JOINT	
PARTS REQUIRED		RR AXLE RT INNER U JOINT	
NOTE #1		RR AXLE RT OUTER U JOINT	
NOTE #2		DIFFERENTIAL REBUILT	
NOTE #3		MASTER CYLINDER REBUILT	
NOTE #4		BRAKE CALIPERS REBUILT	
		RR BR CYLINDERS REBUILT	

## LONG DISTANCE TOWING OF A TR 6

Towing a car has always been a traumatic experience for me, mostly because I always had some cobbled up set up or too small a tow car. Some years back I bought a Pilot brand tow bar and it was well worth the price (about the same as renting it 3 times). Consider one and a tow hitch on one of your cars if you like the idea of being independent of the roll-back tow trucks that charge \$75 or so a crack. Here are two things that you should do any time you tow and which are almost mandatory for safe towing more than a few miles at low speeds. (1) Disconnect the driveshaft to keep from damaging the transmission and rear end and secure it as shown below. (2) Remove the front bumper and bolt the tow bar through the bumper braces.

