

DRIVING A 1X5

Story and photos by Harry Lewellyn

Baja, Mexico, yielded two FOURWHEELING ACADEMYs for this issue. Five leaks in one tire gives way to DRIVING A 1X5.

As I've said many times, Mother Nature is superior to Supreme Court justice. She doesn't get even, She typically gets just a little ahead. Abuse one of Her domain and She will punish. Mess with some of Her green stuff, by accident or on purpose, and She will really do a job on you!

I could tell by the thorns and spacing that a sturdy ocotillo had taken its toll on the right front sidewall, but it wasn't until we painted the black rollie thiny with soapy water that we discovered five holes! Do you suppose Safety Seal® saved Sir Sad Steerer's soapy shock?



Figure 2 Five plugs ready to trim

the final step is driving on the plugged tire. Road heat helps nest the plug and finalize the vulcanizing process. Vulcanizing "chemically" seals the plug to the inner butyl rubber, making an airtight seal every time. In getchaback mode, I've used eight plugs in one sidewall slit!

With a surplus of escapades still squirming in "Successful Saver's" sturdy soul, said señor strived on! Plans to explore Joshua Tree National Park, Death Valley National Park, Saline Valley and points north were not deterred.

Now I can only suspect there was an occasional tire pressure check or two over the next 10 days, but at last report, the lone traveler's tire was destined for continued service. However, he does wish the plugs were black. How annoying to have to explain five red scars in one tire to random passers-by.

Safety Seal® is truly amazing! Traveling the backcountry without one is like playing football on a billiard table! Huh? It just doesn't make any sense whatsoever.



For this one, we removed the tire. Normally, I plug tires on the 4X, but considering first evidence, a more thorough investigation was warranted. Figure 1 shows two things: Xs over four holes and the bubbly nest (right, middle). The latter shows how easy it is to find even the smallest leak using soapy water.

I carry a small container of regular, concentrated dish soap in my tire kit and use about one half teaspoon per cup of water. Inflate the tire to max load rated pressure, paint liberally, stand back and let the leaks bubble forth. No leak can escape this investigative process.

Next, mark each with an X precisely centered on the hole, then remove any "foreigners." Only two of the five holes had enough thorn left to remove.

Follow the Safety Seal® instructions: 1) load and lubricate the insertion tool; 2) lubricate and probe each hole with the other tool; 3) insert the plug to the limit-travel sleeve; 4) withdraw the insertion tool and 5) trim the excess plug. Figure 2 shows five plugs and Figure 3 shows the final trimming operation. Actually,



Figure 1 Xs marks four holes and the bubble trail (right, middle) confirms another.

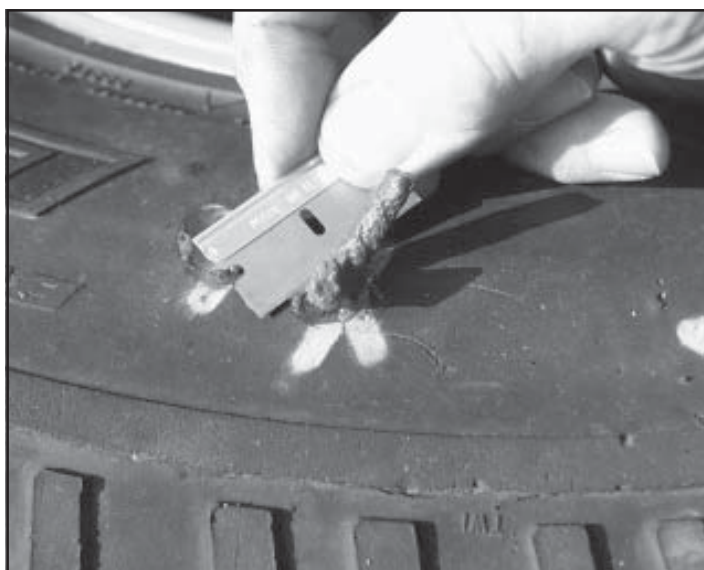


Figure 3 Trim the plugs flush to the sidewall.

FOURWHEELING ACADEMY

PLUGGING TIRES

By Harry Lewellyn

Once again, Safety Seal® saved our buns on the Discover Baja Adventure (four flats on one 4X). A follow-up letter from one of the adventurers prompted this *FOURWHEELING ACADEMY*. I'll share his experience, then go into excruciating detail on detecting and finding leaks, and using Safety Seal®.

A NON-PROBLEM

Wanting to "properly" repair his non-leaking field-fix, upon returning from Baja, Dick Barbar had the Safety Seal® plug removed and the tire patched from the inside. But the patch leaked, so back to Safety Seal® he went. After all, the product is designed to be a (tire) lifetime fix! As of now, the tire lives happily on. He was originally worried because his tire shop "expert" had warned all plugs rust steel wheels, rot aluminum wheels and would explode if flame or sparks got inside the tire.

THE STRAIGHT SCOOP

I appreciate Dick passing along his experience. I'm intently pissed at the misinformation apparent "professionals" (of all sorts) spread. But my engineering nature dictates I not let my bladder do my thinking. I called Safety Seal® and got the facts.

Doug Dunsmore, vice president of marketing, set me straight. The "expert" was all wrong! Oxygen, or oxygen dissolved in water, rusts steel, and there's neither in Safety Seal® plugs. Same goes for aluminum. The only materials used in the manufacture of the plugs are fibers, butyl rubber and two solvents—toluene and hexane. The fibers are of a proprietary nature and the butyl rubber is almost identical to the innermost layer of all tires. It is what makes tubeless tires airtight. It is also the reason the plugs vulcanize to the tire. But how about the flammable solvents used in the manufacturing process?

I continued to gnaw at explosion potential due to residual solvents, so Doug patiently tolerated Coyote persis-



tence. He weighed 12, fresh-from-production plugs, both before and after heating to drive off any volatile solvents. The test showed a weight decrease of 0.7%. Consider further, this is for the entire length of the plug. When properly installed and trimmed, you can conservatively cut this in half due to the amount of the plug that is actually left inside the tire. From my inside-tire observation, it's actually more like only 25% is left inside the tire.

As best I can figure, that's less than 0.00028 ounce of solvents for a fresh plug. And understand, by the time most of us use a plug, it's far from fresh off the production line and has naturally lost additional solvents. I can smell a difference between a fresh plug and my old (circa 1992) ones. 0.00028 ounce or less is not enough solvent to explode.

SAFETY SEAL® HISTORY

Safety Seal® was invented by A. W. Nickonchuk in the mid-1960s (U.S. pat. 3277642, 3783715, 4435470, 4479408). There are three sealing mechanisms: 1) mechanical—the plug sticks to the tire; 2) compression—the tire pinches the plug; 3) chemical—the plug and tire bond to become one. The product has successfully passed tests by independent laboratories both in the United States and overseas. There are conservatively over 350 million plugs currently in the field worldwide. And consider further, there is an industrial version for plugging heavy equipment tires like on earth movers. For

my money, Safety Seal® gets the gold medal for simple, perfect tire repair!

Using the plugger is the safest, quickest and easiest way to handle a simple puncture. Safe because you don't have to jack up the car. Quick because it's done on the car. Tire removal is unnecessary. The easy part improves with experience. Here's mine.

DETECTING THE FLAT

With literally more than a hundred flats under my belt, the most important part is early detection, while moving. This is not that easy on irregular dirt roads. However, driving on an undetected flat can lead to a shredded, useless tire.

Pay attention to how the 4X feels, looks, sounds and smells with properly inflated tires. At the slightest suspicion of a tire problem, stop and check it! I once had a Baja traveler hit the pavement after some mild dirt and then drive 12 paved miles before discovering he was driving on the rim. Between stereo and the luxurious ride, he was numb to the problem.

A low-pressure, leaking tire gives you what I call a hula feeling. The 4X seems to mildly swish back and forth, and is not quite as responsive to normal steering. In my estimation, this is your earliest and best indicator. I test for hula feeling by mildly swerving the 4X.

I once observed my son driving back to camp, and from afar, I could see he

had a flat. On reasonably good dirt roads, low or flat tires seem to roost, kick up more dirt and sand, than their hard counterparts. The Baja traveler above thought he had seen "mud" coming off his truck, when in reality it was the tire falling apart! Also, don't be bashful about adjusting your electric sideview mirrors so you can see the back tires in the dirt. Better than 80% of all flats occur on the rear. This is also a useful technique on the black diamonds. You don't have to guess where your rear tires are, you can see.

Sometimes, over the bumps and rattles, you can hear a difference between properly inflated rolling stock and a flat. Admittedly, this is tough with the A/C and CB blasting.

Low pressure and flat tires flex the rubber to the point of overheating. I suspect if you smell rubber, it's too late, but don't discount your sense of smell either.

FINDING THE LEAK

Once detected, put the 4X in park or in gear and block the tires. You may discover your leak on the inside sidewall. Now find the puffing perpetrator. If it is still partially inflated, you may hear it, feel it with your hand, or if your lucky, see what has penetrated the rubber. If you happen to stop on the leak, it may create a miniature dust cloud under the tire. Be cautious when running your hand over the tire. You're feeling for air, but flesh-ripping foreigners sticking out of the rubber can draw blood.

If the terrain is too rough to move the 4X, or the leak continues to elude

discovery, inflate the tire to 50-plus pounds per square inch (PSI) and re-investigate. If in dust and dirt, another technique is to slowly drive with an observer at the tire listening and looking for a dust cloud. Continued evasion means check the valve stem/core and listen/feel at the bead (rim/rubber intersection).

A touch of saliva on the valve core will promptly disclose a leaker. I use soapy water to detect valve stem and bead leaks. I learned this trick from professional plumber Big Red. It works wonders by creating a small bubble nest at the leak. I carry a large lady's makeup brush and a small container of liquid dish soap in my tire repair kit just for this.

For real slow leaks, I've chosen to drive/inflate, drive/inflate, then fix it at a later, more convenient time. There, I break out the soapy water.

I also carry a large yellow crayon. When discovered, I make an X directly over the leak. I also mark the outside sidewall with a straight line to keep track of the hole for continued inspection until satisfied I've permanently cured the problem.

I then position the leak for easy plug insertion. You just think you are right or left handed. You are actually right or left bodied! I sometimes cuss my left hand for being so clumsy, when in fact, I'm trying to perform a left-handed operation from a right-handed body position.

I've seen experienced backcountry travelers try to use the plugger up in the fender well. I suggest you roll the 4X



Safety Seal kit

forward or backward to accommodate your handedness. I'm right handed and like to work on the right side of the tire. On the front, simply rotate and turn the tire out from under the fender well so you can work on it standing up. Yeah, I know, that's too easy.

With leak located and positioned, see if what created the leak is still there. Slowly remove the nail (for example) to determine the penetration angle. Remember it! This will facilitate easy, successful plugging.

Safety Seal® recommends only using its product when the puncture is straight in. With scores of successful, off-right-

TIRE REPAIR TOOL LIST

- Safety Seal® repair kit
- Conventional patch kit
- Tire boots (sizes to 8")
- Rubber cement
- Large hammer
- Tire irons (two)
- Spare lug nuts
- Lug wrench
- Pipe (lever) extension for lug wrench
- Dish soap (leak detection)
- Small brush (leak detection)
- Valve stems (rubber type)
- Valve stems (screw-on type)
- Valve stem puller tool
- Valve core multipurpose tool
- Spare valve cores
- Spare valve caps
- Light-colored crayon or chalk
- Rag + towel to lay on
- Wire brush
- Small rough file
- Tire rasp
- Jack
- Plywood jack platform
- Air pump
- Tire gauge

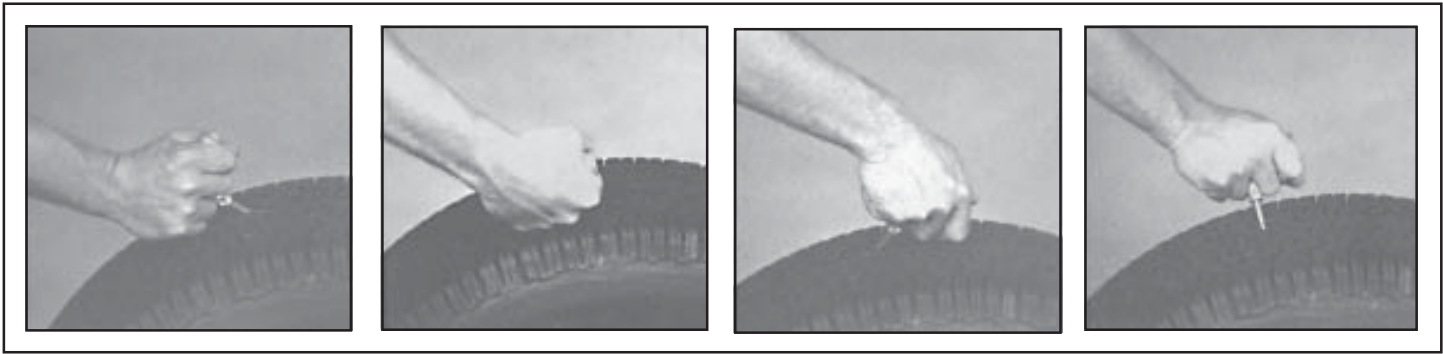


Figure 2. Spreading the steel cords.

angle seals under my belt, I suspect this has more to do with their faith in our ability to exactly duplicate the penetration angle rather than the quality of the product. For example, a 45° puncture sealed at 90° could create another hole.

If you're limited in air or inflation capability, have the plugger ready to go before you remove the culprit. It will obviously leak faster with the nail out.

USING SAFETY SEAL®

Safety Seal® now earns its keep. And be fully aware, as mentioned before, they do not endorse all of my methods. For example, they do not recommend plugging sidewalls, multiple plugs or plugging holes bigger than 1/4". What I recommend is do what's needed to getchaback, then have the overkill inspected and repaired by a knowledgeable professional.

Sparingly dab the *probe* (see Figure, page 10) in the lube provided with the kit. Insert the *probe* halfway, at the nail angle (above). If you found the leak, but not the violator, carefully use the *probe* to determine the penetration angle.

With the *probe* inserted, tilt it to a 45° angle, then move the handle around the hole, maintaining 45° (see Figure above). This temporarily spreads the steel belts out of the way for the next operation. This may slightly enlarge a tiny hole, but removes no material, contrary to the reamers with rubber-cement pluggers.

I've used the other pluggers and gave up on them! The tools are poorly constructed, they continue to leak and are not permanent. Besides, my experience with rubber-cement is that it dries up even in unopened tubes.

Next, you want to load a plug into the *insertion needle* with minimum handling. Peel back one layer of the protective paper, and with forefinger and thumb, at the very tip of one plug, strip

if from the remaining paper. Maintaining the forefinger/thumb grip, pinch the plug to flatten the end. Now, holding the *limit-travel sleeve* up at the *handle*, carefully insert the plug through the *eye* in the *insertion needle*. Taking care not to touch virgin plug, grip the partially inserted plug on the already touched area and pull it half way through. Finally, sparingly dab the tip of the *needle* in the lube.

Now, position the *needle*, at the nail penetration angle, and insert the plug to the limit of the *sleeve*. This requires a fair amount of force and a reasonably firm (filled with air) tire. And with a great leap of faith, swiftly remove the *insertion needle* from the tire at the same angle. I've yet to see a plug come out with the tool. The plug always stays in the tire.

With a little water or saliva, check for leaks. If you're airtight, trim the remaining plug as close as possible to the tire with the razor blade provided in the kit. I originally reasoned the excess plug would wear off and didn't cut them off, but soon learned it creates a problem. I suspect the protruding plug continues to move and hinder the sealing process.

For small holes, one plug usually works fine. If you find you're still losing air, I've experienced two things and this is where experience plays a part. If you can hear but not feel the leak, you probably just need to run the tire on blacktop for a while. The heat helps the chemical sealing process. On a Baja trip, we plugged and trimmed a tire, and it continued to leak. But once we hit the asphalt, it quit.

The other situation is when the hole needs more than one plug. This is a noisier leak that can definitely be felt. In this case, you need to remove the inserted plug, so don't trim it. Pull the plug entirely out of the hole and load

the insertion tool with two plugs. This is most easily accomplished by placing two plugs, side-by-side, using the same two-finger, pinch and insert technique and pushing the pair of puppies into the hole. If it continues to leak, try inserting more plugs alongside the already installed pair. I once cured a sidewall slit with five plugs, but this required a little experimentation. The second set of plugs would drag the installed set into the tire. When and if you need to, you'll figure out how to do it.

The sidebar lists what I carry in my plugger kit. I'm reasonably prepared to plug, patch, boot or replace valve stems and cores in the field. Between that, my primary adjustment tool (six-pound sledgehammer), the knowledge of how to field-mount a tire and the buddy system, we've yet to leave anyone stranded due to a tire problem. The newsletter tires reprint covers more on field repair, inflation and deflation.

Can you leave your spare tire at home if you're packin' Safety Seal®? Of course not, but it certainly does ease the pain of fixing simple flats. Keep 'em rolling!

