Ecological 4 WHEELING ADVENTURES
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FOURWHEELING ACADEMY

GETCHABACK DRILL

By Harry Lewellyn

I suspect most of you have had ni-cad battery failure. I go through ni-cads in CB radios, cameras, electric razors, RC cars, beard trimmer, toothbrushes and particularly, portable drills. I hate to lose the tool when the batteries fail, but most of the time I throw it away. This FOURWHEELING ACADEMY looks at a nifty alternative to tossing your portable drills. It is briefly mentioned in my book, *SHIFTING INTO 4WD*, on page 269.

SUMMARY

By simply connecting a cord and power point plug to a "dead" portable drill, you can make a very effective field tool. It may be powered from either the car battery or your battery jumper pack. With the latter, you have a portable drill that may be used around the car, camp or home. With companies like Harbor Freight (www.harborfreight.com) offering portable drills on sale for around $15, consider buying one just for this

See **DRILL**/p3

In this Issue

TRAIL TIP

STAYING CLEAN

This is part of what SHIFTING Into 4WD offers about staying clean, starting on page 66. For the complete text and graphics, go to www.eco4wd.com/new_site/book_preview/page_answer/066stay_clean.htm

FOLLOW BACK

Actually, you don't have to eat others' dust all of the time! The first suggestion, which also plays a safety role, is just common sense. Don't drive in the dust, and I understand why newcomers do. Some travelers are so afraid of getting lost they lock bumpers with the guy ahead. ... Clean rule one: Follow back a ways.

"A ways" is just far enough to be out of the grime, but occasionally in sight of your traveling companion just ahead and behind...

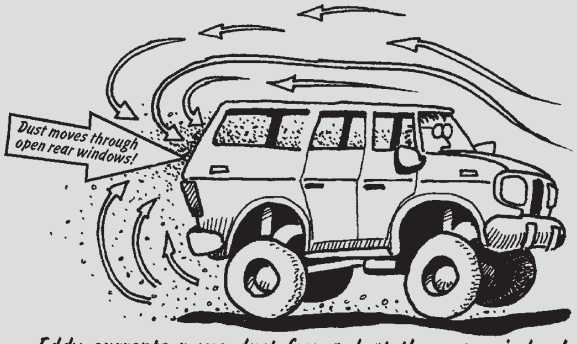
But dust alone is not your final close criteria. No dust in the rocks, huh? How about the rocks the gal ahead is kicking up? Follow too closely and you may end up with one in the windshield! ...

In general, follow back a ways and experience the wilderness, not recreate commuter chaos.

WINDOWS

...Your flat, near-vertical rear window probably won't catch mud balls, but it certainly adds a curve to the airflow. Airflow at the rear of a flat back-windowed SUV sets up things called eddy currents. These illogical little dust devils move dirt forward. The same goes for pickup trucks with camper shells. An open pass-through or rear window assures you of a dusty dash at day's end. Keep those windows closed in all but the best of conditions.

I travel with my windows down much of the time. I like the smell and feel of the outdoors. But I never hesitate to hoist the shields when needed.



Eddy currents move dust forward at the rear window!

USE A/C MAX

...My advice is to use your air conditioning 100 percent of the time. It really helps keep the inside of the vehicle clean. The trick lies in selecting the option that *recirculates* internal air. This is sometimes called "RECIRC," "MAX" or there may be a graphic that shows an arrow *inside* the vehicle.

The recirculate position does what it implies. It recirculates existing, clean, internal air and only brings in about 5 to 15% new, external, dirty air. In other modes such as "bi-level," "economy," "norm," "vent" or the external arrow graphic, you are introducing 85 to 95% "fresh," external, dirty air. That simply means more dirt, too! Further, recirculate pressurizes the inside and keeps the dirt from entering at less conspicuous points like the door bottom water drains.

But what about cold days? Your temperature control will heat the air-conditioned air just like heater air. Just move the temp lever to make you comfortable...

What most folks don't know is that defrost automatically turns on the air conditioning. This dehumidifies the air blown onto the windshield (removes the moisture), which means no more fog. Air conditioning is designed to deliver air at *any* temperature. Try MAX with the windows up, at any temperature. It works wonders with regard to staying clean.

See page 10 to order.

Ecological 4WHEELING ADVENTURES

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Composition: Harry Lewellyn

ECO4WD is committed to passive appreciation of Mother Nature and ecological backcountry travel on unpaved roads.

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Unmodified project drill

Project drill without battery

Disassembled project drill

Figure 1

DRILL, from page 1

conversion. The project drill is SKU 46442 (keyed chuck) or 46443 (keyless chuck).

RECTAL VISION

If you're a regular newsletter reader (since January 1998), you may remember "Bury My Ford in Cerocahui" (www.eco4wd.com/new_site/newsletters/bury_ford_cero.pdf). I described the trials and tribulations of recovering my 4X from the depths of Copper Canyon, Mexico. I was delayed for the better part of a day with dead ni-cads (two sets) for my portable drill. I needed to drill eight ½" holes for tow bar attachment because I had drilled the initial four in the wrong location! Five-plus years later, while writing this article, my rectal vision kicked in.

Had I been thinking like the ol' Coyote recommends in his book, I would have been thinking function, not part: I was thinking in terms of dead drill batteries, not power for the drill. A pair of clip leads connected to the drill and any vehicle battery would have shortened my recovery by a day or so.

NI-CAD BATTERY FAILURE

Ni-cad batteries fail primarily due to random use: that is, discharging and charging at irregular intervals. Most get fully charged, then lay idle on the shelf for months. Periodic charging and discharging sets a "memory" in the batteries and reduces their overall capacity. The proper practice for ni-cads is to store them fully discharged, but beware.

In a future rechargeable battery article, I'll point out the pitfall of over discharging. This can kill individual cells in a battery pack. Any battery pack over 1.5 volts is actually several batteries (technically, cells) connected in series.

If you want maximum ni-cads life, you should use them regularly like with an electric shaver or toothbrush. You run them completely dead, then fully recharge 'em.

DRILL RESURRECTION OVERVIEW

You basically want to remove the

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DRILL, from page 3

battery or battery pack connector from the drill (usually in or at the bottom of the handle) and replace it with a cord that has a conventional cigarette lighter plug (power point connector) at the non-drill end.

STARTING POINT

Figure 1-A shows the stock project drill. It has a 3/8" Jacob's chuck (3/8" and key-chuck absolute musts in my book), 12-volt reversible, variable speed motor and torque-adjustable screwdriver capability. It was designed to accept battery packs with the intent of recharging the standby while using the other.

Don't be too concerned with a low voltage rating of your failed drill. Higher rated voltage drills should not be converted. That will be harder on the drill than a lower voltage rating.

My first conversion was a 7.2-volt Mikita. Two things come into play regarding voltage. First, most modern motors have a thermal, self-protect device within that shuts the motor off when it exceeds a certain (non-destructive) temperature. Secondly, the speed control (assuming you are converting a variable speed motor) is a semiconductor, and having come from that industry, most are designed and rated well in excess of the indicated voltage. But, to overcome wasted labor, test the drill first.

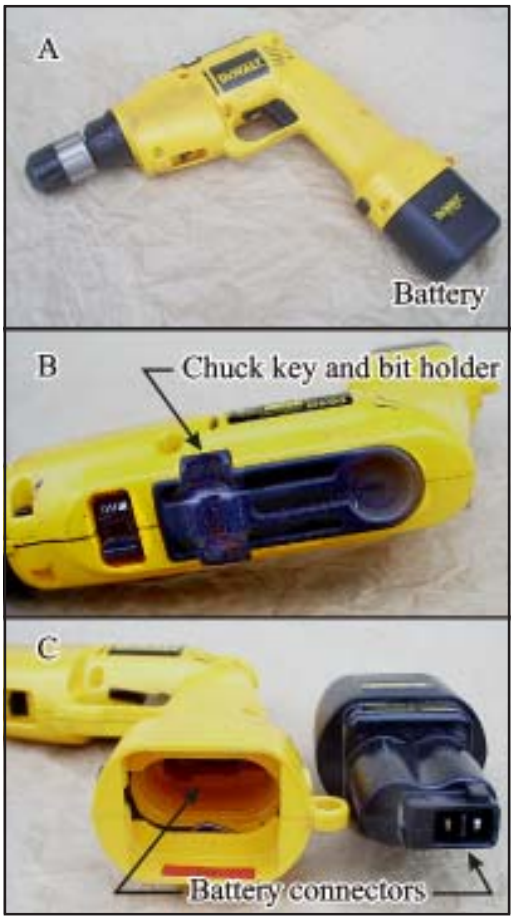

Figure 2 A) DeWalt drill; B) Chuck key and screwdriver bit holder; C) Battery connector details

TEST THE DRILL

Connect the candidate drill to a 12-volt DC source. Clip leads are convenient, but the connections may also be soldered or tightly twisted to the plus and minus power wires of the drill. Keep these straight for some semiconductors can be instantly obliterated by a reverse connection. If you twist the temporary connections, make sure they are very tight. Poor twisted connections can lead to destructive overheating.

Now, mount a 3/8" drill bit and drill four holes in ¼" steel one right after the other. That's about as hard a duty as the drill will ever see. If it quits, give it a chance to cool (1/2-hour minimum) to see if it has really gone bye-bye or the thermal protect is just doing its job. If the drill said farewell, you've only invested minimal labor and haven't lost anything you weren't going to eventually throw away, anyway. If the drill passes this test, you've got a good one, so continue.

INSPECT THE INNARDS

Most drills disassemble fairly easily. If it has one, first remove the grip pad (see Figure 1-C). This soft rubber piece is usually partially glued and "snapped" into the plastic case (body). Don't clean the glue off either piece. It's rubber cement and kept clean, it will work again for final reassembly. Also, don't over glue it, for you may want to disassemble it in the future.

Look for other pieces like a chuck key or screwdriver bit holder that straddle both halves of the body (see Figure 2-B). These must also be removed prior to separating the body halves. Further, there may be body screws hidden beneath. With the project drill, there was one hidden beneath the screwdriver bit.

With the drill body lying flat on any work surface, hold the upper half in place (down) and remove all of the body-attach screws. Note if there are different lengths or sizes in different locations.

With all screws removed, and a slight pressure holding the upper and lower halves in contact, try to grip the upper half to uniformly lift it straight up from the lower half. Take a peek as you lift to ensure the innards remain in the lower half. Gravity helps achieve this. Note how the wires are routed and secured. Also note the position and how the reverse switch nests.

Most drills are designed for the upper (screw head) half of the body to lift off and for all parts to nest in the lower (threaded) half. The motor, gears, torque mechanism, reverse switch and chuck will usually stay perfectly in place short of the wires and speed control trigger (see Figure 1-C). They typically want to take a little twist due to the springiness of the wires. Let them have their way, just note the correct position of each wandering component for reassembly.

Regarding reassembly, do not over tighten the body screws, for their "nut" is just the plastic in the other half of the body. It's best to clean the plastic from these screws to assure a non-interference fit.

The drill-side battery connector may be a separate piece, as was the case for the project drill. Or it may be part of the body halves as with the DeWalt (Figure 2-A and -C). Remove the battery connector if possible.

NI-CAD BATTERY DISPOSAL

Understand cadmium is bad stuff! Ni-cad batteries require special disposal considerations. They can be recycled if properly disposed of. Do not throw them in the trash. Do not throw them in any body of water. Do not burn them.

Figure 3 Project drill power connector conversion

Call you local city disposal service to learn how to properly dispose of ni-cad batteries in your area!

MODIFY THE BATTERY CONNECTOR

If the battery connector is part of the case, consider using it as is. If you want to go the extra step, remove all parts so you have access to both bare halves of the body for modification. I find a digital camera very useful at this point. Take progressive pictures of the disassembly process. You'll find these very important for reassembly.

If the battery connector is removable, cut, mill, file and remove the excess plastic. Figure 3 shows the before and after look of the project drill's battery connector.

Think about a power wire strain relief. This is something that keeps a dropped drill, dangling by the power wire, from pulling the speed control guts out of the drill body. It may be built into the body. I used a standard AC power wire strain relief. A reasonable alternative is simply a plastic tie-wrap secured to the power wire near where it will be epoxied in place.

POWER WIRE SELECTION

If your power wire length will be long (over 6-feet), use 12- or 14-gauge wire. If it will be short (6-feet or less), most likely, 16- or 18-gauge wire will do. Too small a wire with a very powerful drill will lead to power loss in the cord and reduced drill performance.

In my Mikita conversion (see Figure 4), I used a twisted pair of black and red 12-gauge wire. That was over kill.

For the project drill, I used about five-feet of a conventional 16-gauge, AC cord. I planned to use the drill exclusively with my battery jumper power pack and figured I could put the power source as close as needed to the point of use.

CONNECT THE WIRE

You have four options regarding connecting the power wire to the drill. With the Mikita, the batteries were internal, so I just removed the batteries and connect the wires per the following paragraph and Figure 4. The built-in strain relief worked perfectly. With the DeWalt, I could have converted a battery plug to accommodate the wires (see Figure 2-C, right) or connected the wires directly to the drill-battery connector (Figure 2-C, left); however, this drill was not converted. For the project drill, I chose to modify the battery connector to accommodate the wire (Figure 3). Do what fits your style.

Taking note of the plus (usually red) and minus (usually black) wires, connect the replacement power wire to the drill. If you use a conventional AC cord, most have two colors, but some have an identifier (tracer) of some sort on one wire. This is typically a ribbed tracer. Sometimes, it's a colored thread inside, next to the stranded wire. If it has three wires, disregard the (traditionally) green wire. I always use either the white or the tracer for the plus connection. Black, except in the house-wiring world, usually represents ground or minus.

I no longer trust crimped (only) connections. I now make it a habit to crimp and solder all connections, and insulate the connection with a layer of shrink tubing. I also leave a little "service loop," or extra wire within the body to accommodate assembly and disassembly. Don't make things so tight that you can't assemble/disassemble the unit, but before you start, make sure all of this fits in the body!

SECURE THE WIRE CONNECTION

I chose to epoxy the conventional strain relief to the modified battery connector (see Figure 3, After). Use your imagination to make a functional connection. Pretty is secondary to reliability and functionality.

Considering gravity and quantity, I was able to apply small amounts of quick-dry epoxy to attach the strain relief to the battery connector as shown in Figure 3, "After." The trick to get the epoxy to stick to plastic is to slightly rough it up with a wire brush.

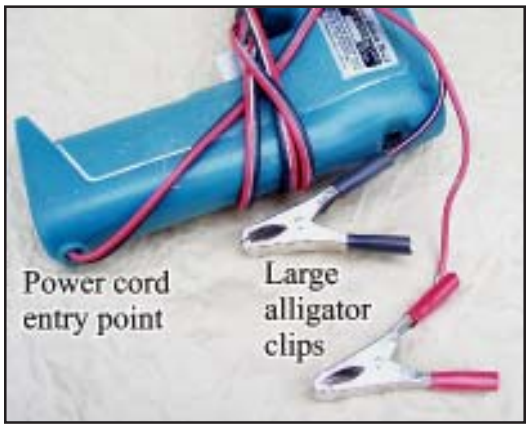

Figure 4 Mikita conversion with alligator clips

CONNECT THE

See **DRILL**/p6

See **DRILL**/p6

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POWER PLUG

I'm not a real fan of cigarette lighter connectors, but that seemed appropriate for this application. A viable alternative would be to use fair-sized alligator clips (see Figure 4). In either case, again, remember to pay attention to plus and minus.

TEST THE MODIFICATION

Perform the same test as described above. Check the wire and plug for overheating. A hot wire needs to be replaced with larger wire (small gauge). An overheating plug may need to be entirely replaced, but try this first. Clean the center and outer contacts, and attempt to make the minus (outer) connection tighter by slightly expanding the contacts.

DRILL POWER

The easiest way to power the drill is to use a jumper battery pack. However, you may not have one, the cord may be too short to reach the use area from the vehicle power point or the power pack may be dead. What do you do then?

With a traveling companion, consider moving the other vehicle (battery) closer to the use area so the cord reaches. If you are alone, you may also remove your battery for nearby power. And given the time, and the motor is running, recharge the power pack. If you're missing the proper recharging plug, improvise a temporary charging connection between the system battery and the battery pack, and repeating, observe the proper polarity. According to the Coyote, "there is always a way"; we're just limited by our imagination and creativity, as I was in Copper Canyon.

Figure 5 Getchaback drills: A) 1/2 to 1/16 inch drill bits; B) Wire brush; C) Grinding stones; D) Rotary file

DRILLS

Assuming by the time I <u>have</u> to drill something in the field, it's serious, I don't carry too large a selection of drills. I'll make do with what I have. Think big, for small is usually associated with minor problems. See Figure 5 for what I carry.

OTHER TIPS

I hate to lose the chuck key. To completely eliminate the chance of this, I tether it to the drill (see cover photo). In this case, I used a chain, fishing swivel and key ring.

Regarding packing, I cut up an old wet suit and slipped two pieces of the "arm" over the drill for storage in my getchaback box.

Happy drilling!

Figure 6 Getchaback drill storage idea

FOURWHEELING ACADEMY

By Harry Lewellyn

MIDLAND 75-822

How many features can you pack into one handheld CB radio? Midland answers that with the 75-822. This compact little unit is big on performance.

CONVENTIONAL FEATURES

This is a full-featured CB radio. It has 40 channels, 4-watts output power, volume, squelch, a built-in speaker, mic and antenna, plus external mic and speaker plugs. The easy to read LCD display features an "S" (signal strength) meter, displays the status of all functions and has a backlit feature for nightime viewing (press the LIGHT button). It sports microprocessor control and is loaded with digital features.

DIGITAL FEATURES

Beeps report "ready to operate" and all function completion. You can automatically switch to channel 9 (emergency channel) or channel 19 (highway channel) using the CH9/19 button. Dual watch (press the DW button) allows you to monitor two channels (selected by you) at the same time. Or, you can scan (SC) all 40 channels or five selectable channels (M.SC). The LCD panel displays either the channel number or the frequency (hold the F button to switch between). The memory buttons (M1 thru M5) are used to set and select five channels of your choice. The LCR (last channel recall) button moves between the current and previous channel. And, like setting a digital watch, the UP/DOWN buttons rapidly go through all 40 channels when held down for over one second. The H/L button allows you to toggle between high (4-watts) or low (0.5-watts, LOW on LCD) transmit power. This, along with the automatic power save feature (SAVE displayed on the LCD panel) and automatic backlight off feature (off after four seconds) let you know Midland was definitely thinking of your battery bucks when it included these features. Now comes another plus!

WEATHER

The CB/WX button toggles between the weather stations and CB. Using the UP/DOWN buttons, you can select any of 10 USA stations.

KEYBOARD LOCK

I'm annoyed by undesired channel switching and other function changes as I handle any radio. Midland cures this with the LOCK button. It locks out the keyboard, but logically excludes the push-to-talk (PTT) and backlight buttons.

MOBILE CONVERTER

You can power the 75-822 with one of two battery packs (six conventional batteries or eight ni-cads) or the nifty little "converter" (part #18-821).

Used in place of a battery pack, it has a power point plug and a standard coax antenna connector at the ends of two lenghty cords. This means no more dead batteries and you gain the range of your external antenna.

I'm really impressed with Midland's 75-822.

CONTACT INFO

Midland Consumer Radio
1670 N. Topping
Kansas City, MO 64120
(816) 241-8500, ext. 209
www.midlandradio.com
midlndcb@midlandradio.com

Figure 1 Mobile converter (left) and keyboard/display panel (right)

Figure 2 75-822 with battery pack

2003 Coming Events

EVENT	DATE	REMARKS (See Bonus Issue N/L /p# for more info)*
Fat Hill Fandango (H)	July 19 to 21	Historic California/Ghost town tour /p30
Rubicon Rendezvous (C)	August 14 to 17	Camping roughie in Tahoe, CA /p30
Monache Meandering (C)	August 16 to 18	Historic California tour /p31
Arrowhead Brunch	September 7	Easy back way into CA's San Bernardino mountains /p28
By God, to Bodie (C/H)	September 13 to 15	Historic California ghost town tour /p31
Golden Leaves & Trails (C/H)	September 20 to 22	Historic California tour /p32
Death Valley II (C)	October 17 to 20	4WD camping mini-vacation /p32
Copper Canyon Mexico (H)	November 7 to 18	See Mexico's Barranca del Cobre up close /p27

2004 • • • 2004 • • • 2004 • • • 2004 • • • 2004 • • • 2004 • • • 2004

Death Valley I (H)	January 23 to 26	Furnace Creek Ranch-based backcountry tour /p23
Pinion Mountain (C)	February 14 to 15	Roughie, camping, skills trip /p23
Truckhaven (C)	February 28 to 29	Roughie, camping, skills trip /p24
Baja Whales & Rock Art (H)	March 5 to 11	Great intro to Baja — Open to 2WDs /p25
Lunch in Lucerne	March 20	One-day rock art/botanical/geologic high desert tour /p24
Borrego Boondoggle (H)	March 26 to 28	Get acquainted with the Anza-Borrego state Park /p25
Lucerne Sand session (C)	April 3 to 4	Learn the skills of driving on sand /26
Mojave Expedition	April 10	One-day tour of the historic Rand Mountains /p26
Copper Canyon Mexico (H)	April 16 to 27	See Mexico's Barranca del Cobre up close /p27

(C)= Camping trip (H)= Hotel-based trip = Schedule subject to change

*=Request a copy or see our Web site, www.eco4wd.com, "What's New"

INTRODUCING *THE HAMMERS!*

TRIP LEADERS: *Blaine Johnson and the Coyote*

WHAT: Take it to the next level with this ***extremely*** technical, axle snapping, tie rod bending, body damaging introduction to the most infamous trails in the USA, the Johnson Valley Hammers! *They demand respect.* It's the ultimate test of man and machine, and creates an incomparable sense of exhilaration and accomplishment. ***Tell a friend!!!*** We cannot over stress the difficulty of these level 5 trails, so we will screen all applicants and 4Xs. Here's how it works. We start with a vehicle inspection by the leaders, then start the "seminar." We address airing down, using and being a spotter, driving techniques, field repair and recovery. We "graduate" with a "test" run up the first quarter mile of Jack Hammer. The leaders reserve the right to pass or fail any applicant, as do you to decline.

8:00 a.m. Saturday morning, it's off to Sledgehammer for the challange of a lifetime! For those less willing, we'll offer Aftershock. We expect to finish about 4:00 p.m. Sunday is open.

WHEN: Sept. 19 to 20, 2003 (Fri. & Sat.) Start at noon on Friday.

FEE: First time offer, $250/4X and driver. $75/additional passenger
DEPOSIT: Full fee

REFUND POLICY: If you don't pass the tests or choose not to participate, the refund will be your fee less $100. Call or email for specifics.

REQUIREMENTS: Short wheelbase, fully locked, 33/35" tires, etc. Call or see www.eco4wd.com/tours/hammer.htm for complete details and pictures. See www.justaddrocks.com or mrblaine@cox.net for more on Blaine Johnson.

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See page 10 to order 4 pack

No-Loss Valve Caps

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Order rope with or without a large vinyl storage bag on page 10.

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ULTIMATE TUBELESS TIRE REPAIR!

PERMANENT REPAIR: Road heat vulcanizes the plug through a patened repair process. It will not flow under heat or pressure. You make the repair once and it conforms to the shape of the puncture and outlasts the tire.

SIMPLICITY: The first 100% self-vulcanizing rubber-fibre material, *Safety Seal* uses no messy cement. With the patented insert tool, tires can be plugged in minutes, *on the car*, with little effort.

SAFETY SEAL is made from the same ingredients as the tire itself. It is 21 plies of high-grade synthetic fiber completely embedded in a super-sealing vulcanizeable rubber composition. Each yarn is individually coated and then twisted into a durable plug.

Kit comes with a durable 8" x 12" x 3" plastic case, pictorial instructions and 60 plugs.

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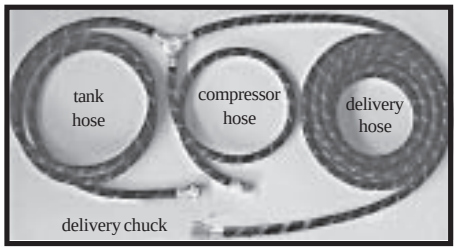
Coyote AIR ROBBER

UNLIMITED AIR: With an AR, you have air with *or* without a compressor.

SIMPLE TO USE: Connect the AR's screw-on valve stem chuck to any inflated tire. Use the custom lock chuck at the other end to air up.

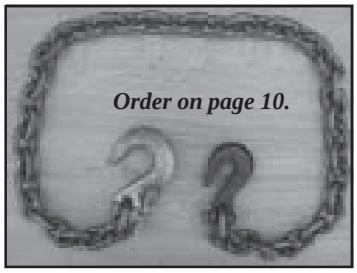
INNOVATIVE DESIGN: Connect a compressor to the valve stem at the end of the 3-way manifold and you continuously replenish the source-tire while you fill the others.



QUALITY CONSTRUCTION: The AR is 22-feet long, has brass fittings, including a screw-on chuck, a valve stem and a clever lock chuck. ***Order on page 10.***

COYOTE CHAIN

Your buddy is stuck.
You are free, but you can't connect...



The Coyote Chain is your solution!

Attach the **slide hook** (left) directly to the 4X frame or use it as a choker to cinch up on anything, including the downed tree blocking your trail.

Loop the **grab hook** (right) back and attach to any chain link. Both clevis hooks are easily removable, leading to endless recovery and repair uses. Includes 3' of welded, transport, heavy duty 5/16" chain.

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TRUCK AIR CAN'T BE MATCHED FOR THE PRICE!

Ecological 4WHEELING ADVENTURES

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