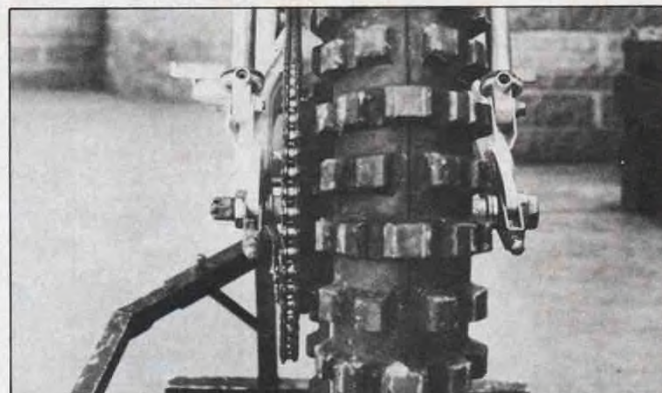
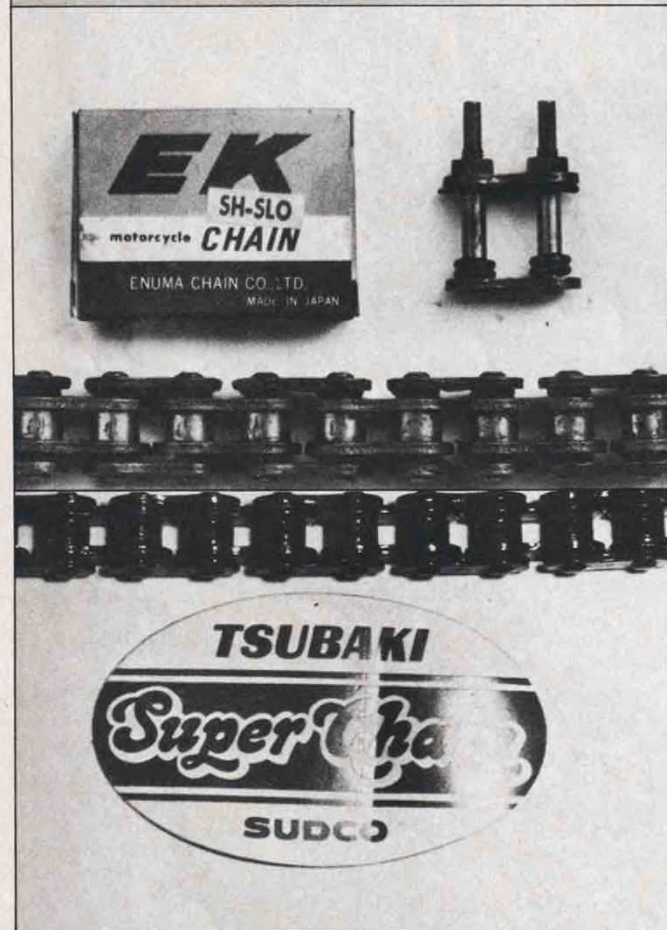
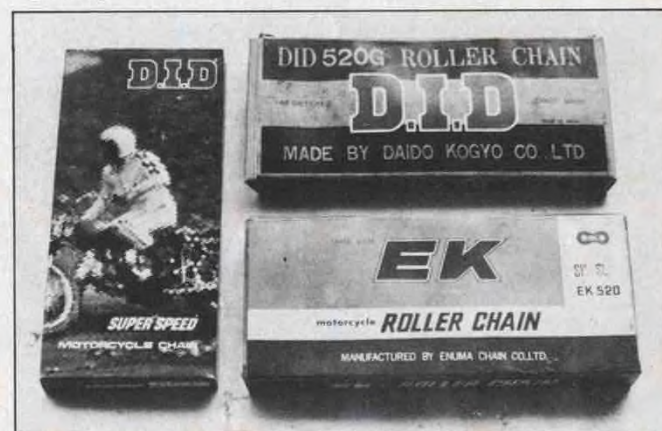


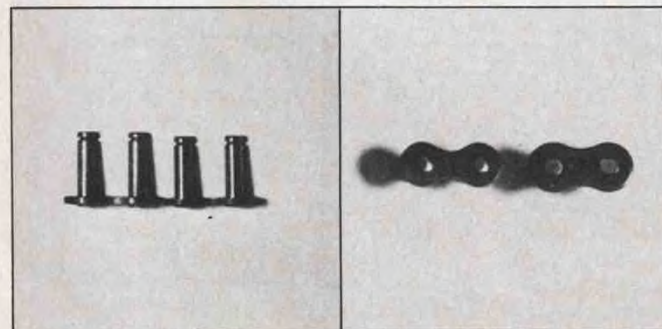
When your old chain looks like this, it's time for a new one. From here, it will not only wear out even worse, but can ruin both sprockets as well.



Alignment of the chain is critical. Don't rely on the grooves notched in the swingarm. Get behind the rear sprocket, and sight-align it with the counter sprocket.



To extend chain life and increase performance, the major manufacturers are coming out with new chains, such as a link-plate bushing chain, or an O-ring unit. Each have their own advantages and disadvantages.



Although there are standards for chain sizes, the links can still differ in pin thickness and sidewall size. Match your master-link with the right chain.



There are many different brands of chains, as well as many types designed by only one manufacturer. Look at each and find which is right for your riding before throwing one on your bike.

Because the chain is such a simple piece of equipment, it's easy to overlook it when maintaining a motorcycle. There are usually only a handful of riders at the track who know the proper way to take care of one. After indulging in this article, you should be ready to join that elite group of cyclists who not only know what a chain is and what it's all about, but also how to fix it and keep it going for a lot longer than the normal bozo who can't wrench his way out of a Glad bag.

What is a chain, anyway?

A drive chain is a series of links working together to transfer the power of the engine to the rear wheel, creating forward motion. Each chain consists of three pieces, each with a specific purpose, and containing various parts which are vital to a chain's performance and life. Those three pieces are the pin links, the roller links, and the master link. Pin links are two pins, with two sideplates pressed on each end to hold them together. Their purpose is to hold the roller links in position.

A roller link is two rollers with sideplates pressed on, and a hollow center where the pin link slips through to connect. Between each roller and pin is a bushing, which protects the pin. This area between the pin, bushing and roller is the most important part of the chain, for it takes the greatest abuse, and wears the fastest. The master link you should all know about. It connects the chain, and is the link which is taken apart to remove the whole chain from the bike.

That is a very brief description of a roller chain. It was first designed by some guy who called himself Dionysius of Alexandria, and who worked under Alexander the Great. Dino passed the idea to his good buddy Leonardo Da Vinci, but Lenny was given most of the credit for developing the chain by historians. Poor old Dino got ripped off somewhere.

Now that your history lesson is over (just show that last paragraph to your teacher the next time you get caught reading this in class), let's go into the main types of roller chains on today's market, dissect them and give you some of the pros and cons of each.

The first type is the standard roller, which we just covered. They have a high amount of friction, and tend to wear out very quickly. Some companies, such as Tsubaki, are putting in little bushings at the end of the link pins to ride between the roller link sideplate and the pin link wall, which are designed to relieve the stress and friction built up between these two points.

The newest type of chain is the O-ring chain. It is not a totally new concept, and has in fact been used for years

in industries, but motorcycle chain manufacturers have just been getting into the little rubber ringers in the past few years. The O-ring is again the same basic plan as the standard chain, but instead of the roller sideplate to link sideplate friction, or between-plate bushing, a little rubber ring is placed between the sideplates on the pin link's pin. This is designed to keep dust and grime out of the pin/bushing area which is so critical in chain life, and to keep lubricant in.

Now, the standard chains have been working fine for a lot of years, but they seem to wear out faster with the new bikes' increased power displacements. The bushing between plates eliminates much of the friction built up here, allows the lubricant inside the bushing to stay in longer before wearing out, and dramatically cuts down chain stretch. The O-ring unit does the same thing, but unlike the bushings, it is not suited for off-road abuse. The manufacturers of the O-ring chain recommend that you keep the links out of the sun for prolonged lengths of time, and when you park the bike, put it in the shade. That's a lot to ask from a rider who competes for hours at a time in the burning sun. And the manufacturers also state that lubing it with a spray can does little, if any, good at all. That's tough to stomach for a serious competitor.

Check it out

Now that you know what chains are all about and have decided which one is the best suited for you, let's examine what you now have on your skoot. Re-

move the chain from the sprockets and place it flat on the ground so you can see every roller. Take the ends of the chain and bow them upwards. If you can measure over six inches from the very top of the bow to the very bottom mark of the chain, then you're ready to go out and buy that chain you've just decided was right for you. If the chain is good, make sure it doesn't kink or hang up in between rollers. If all goes well, you can still use it.

Next, take a look at the sprockets. Examine the teeth to see if they are "hooked" or look like a dolphin's fin. If they're badly hooked, take them off and get new ones. A worn sprocket will quickly wear out a chain, and a worn chain will quickly ruin a new sprocket. While eyeing the sprocket, take a look at its sides. If one side is worn shiny and bare while the other is dirty and normal, then you've got something out of alignment.

Try to line up the sprockets and see if you can't discover what's wrong. It is not just a fast-wearing chain. There's a good chance that either the rear wheel isn't properly aligned or that the frame or swingarm is bent. If it's the rear wheel, straighten it out before installing the new chain, then check it again after putting the new set of links on. If you find that it's the frame or swingarm, take the bike to a frame shop.

New hookups

Putting on a new chain is not very difficult, if you know how to do it the right way.

First, after examining everything, take the new chain and run it up the

MASTER THE LINKS

GOT ANY SPARE CHAINS, BUDDY?

Roller derby ■ By Brian George

rear sprocket. This will guide the chain for you so you don't have to stretch one arm up to the front of the bike while holding the other back along the rear wheel. Slide the chain through the countersprocket, and down underneath the swingarm. Be sure to run it through all of the guides and tensioners before reaching the rear sprocket again. Once back to the rear, place the two ends of the chain next to each other on the tooth of the sprocket. Slip in the master link from the back, slip over the link's outer sideplate, then put on the clip. It is very important that the closed end of the clip be pointing in the same direction that the chain moves while in motion. That way, if the chain hits any of the guides while slapping around, the open ends won't catch and snap off. It is also important that you check the clip occasionally to make sure it's still fitting snugly to the plate. If it isn't, get a new master link and replace the whole thing. These masters are cheap.

To adjust the chain, there are usually marks along the rear of the swingarm to aid you. Those little grooves are nice to use as a starter, but don't rely on them for your final adjustments. For an accurate alignment, put the bike up on a stand or a milk crate and go to the rear of the back sprocket. Eyeball down the chain to see if the two sprockets line up perfectly. If they do, you're all set. If not, turn the adjustment bolts (or snails) until you have a perfect line running straight from sprocket to sprocket. This is one of the most accurate methods of alignment you can use, at home or at the track.

If you are constantly throwing chains, it isn't the chain's fault, it's yours. Either you don't have the chain lined up, or it's too loose. Tighten the chain while aligning so that there is about $\frac{3}{4}$ of an inch play in the middle of the chain underneath the swingarm, while the chain tensioners are held away from the chain.

If the chain is too tight, it'll wear out quite rapidly, and if it's too loose, all of that whipping and thrashing against the guides will ruin it. Put this next line on the front of your toolbox every time you put on a new chain before a race:

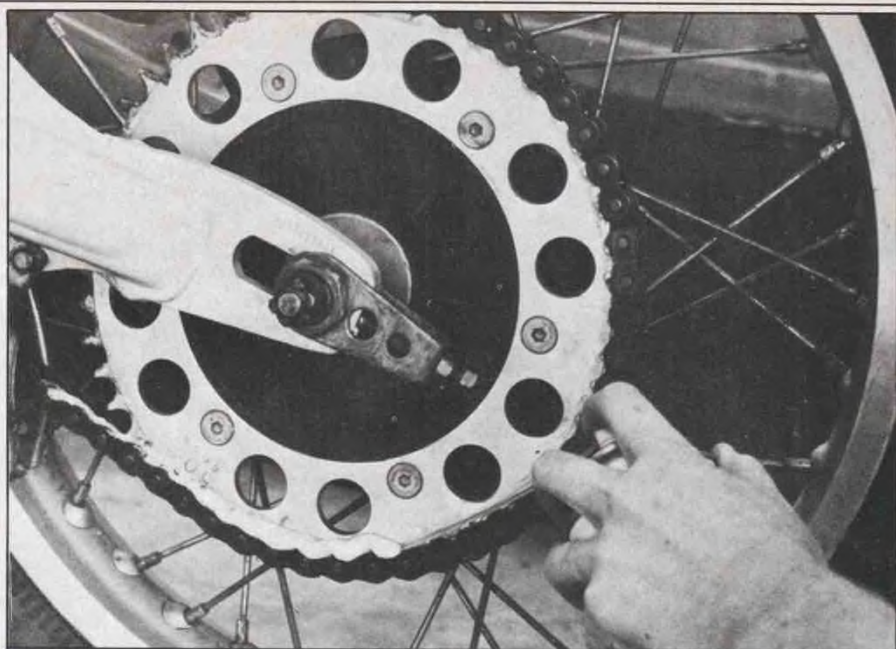
ALWAYS READJUST A NEW CHAIN AFTER PRACTICE!!!

It will stretch normally during practice, and if left alone, will fly off in your first moto, guaranteed. Keep on it and don't forget.

While out on the trail, it's a good idea to check your chain tension every hundred or so miles. This will give you time to see how much the chain is stretching, and will give you an idea of its life expectancy by comparing your adjustments each time.

Lubing lessons

Every chain has to be lubed at some



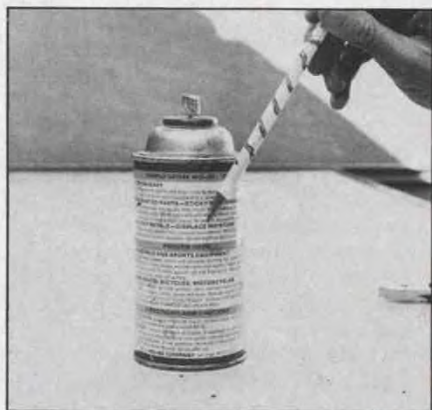
This is the proper way to lube a chain. Don't just spray the links to stop them from squeaking; get the lube inside the plates and pin bushings, where it will do some good.

time or another. For a motocrosser, it's after every moto. For an enduro rider, it's out on the trail or at checkpoints. And for a desert racer, it's at various points of nowhere, USA.

Lubrication is not the art of quieting down a noisy chain or spraying away dirt and grime from the rollers and sideplates. It is supposed to get oil down in between the link pin and the roller bushing. With oil down there, the lubrication does four things. It prevents gauling, or keeps the pins from literally welding themselves to the rollers and bushings, which causes severe kinking; it prevents rust and corrosion to the main parts of the chain; it reduces friction and heat build-up; and it works as a sort of shock absorber to soak up the impact of the roller hitting the sprockets.

The proper way to lube the chain is to spin the rear wheel gently, and to point the little plastic straw protruding from the chain lube can at the surface between the roller sideplates and the pin link sideplates. From there the oil will get into the bushings and lubricate the vital parts which need it the most. Just spraying the whole chain wildly not only makes a big mess out of everything, but doesn't get enough lubricant into the bushings to do any good.

A little hot tip to properly lube the chain quickly, easily and most effectively is to point the stream of lube toward the bottom of the rear sprocket, close to the chain. From there it will run onto the chain and penetrate the bushings, right where it is needed. Slowly spin the wheel when lubing a chain, though, so all of the lube isn't thrown off the chain before it has a chance to get somewhere and do any good.



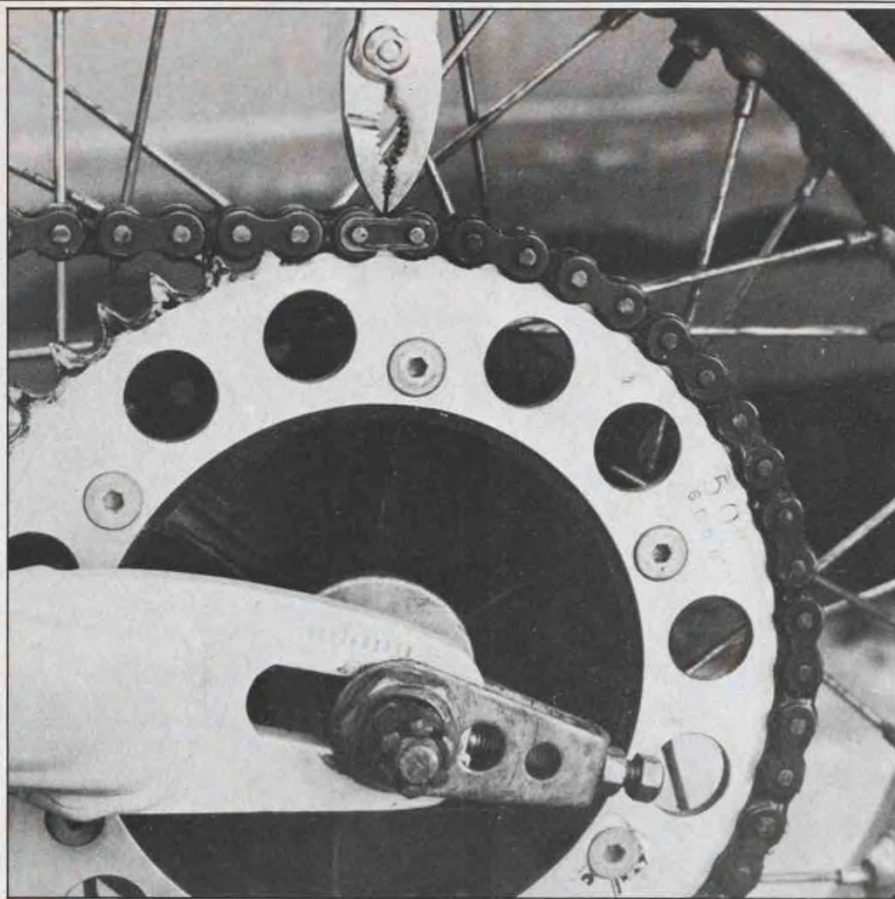
If you do happen to wash your scooter with the chain on, lube it with a water displacing chemical, such as WD-40, so water will not get trapped inside.

A chain cannot be lubed too much, but there is a time when you don't want to spray the chain with normal chain lube. That time is right after you've either washed the bike with the chain on, or just crossed a stream or river. The water gets up inside the bushings where it can rust and corrode the pins. If left alone, normal riding will force the water back out, but if you quickly squirt on some lube all of the water will be trapped inside of the link, and will rust the pin to weaken the chain considerably.

If you do feel that you need to lubricate the chain, make sure you use a water displacing lubricant, which will remove the water before it can do any damage. WD-40 and Bel-Ray Six-In-One are great for this. If you have something else and wonder if it is displacing, just read the label first. It should say right on it.

Clean sweep

There are many rumors, myths and



One of the major no-no's is to put the masterlink clip on backwards. Face it toward the counter sprocket when the master is at the top of the rear sprocket.

half-truths about the proper way to clean your chain after a hard day's ride, but only a few know the hot tip on getting the links fresh again.

Our method here at DIRT BIKE is to remove the chain before ever touching a drop of water to the motorcycle, put it in a pan of drained oil, and let the old lubricant clean the chain for us. After a good bath in that, we transfer it to a bit of clean oil, then after another good soaking, put it back on the sprockets of the freshly cleaned bike.

Now, that's the way to do it at home. The drained oil can be appropriated after an oil change on your van or truck, but if you don't have any handy, use new oil for the whole process. If you are at the track, you're probably not going to have the time or the oil to do this kind of a cleaning. In this case, the best way for between-moto cleanliness is to pack along a can of chain lube and a good, strong wire brush. After practice and each moto, put the bike up on a crate or a stand and scrub the chain with the wire brush for about a minute. After you've knocked off most of the dirt, take a can of chain lube and squirt down the whole chain, rotating the rear wheel slowly. Without ever taking the chain off of the motorcycle, and just cleaning in the preceding manner, a chain will last a good long while.

There are those who believe you

have to take the chain off of the bike and soak it in gasoline or solvent in order to keep it clean. Well, that bath will definitely get it clean, but there are two problems. The gasoline or solvent will remove any form of lubricant that you have in the bushings, and the chain will rust almost immediately after you remove it from the solvent bath.

If you are going to clean your chain in solvent, make sure you have a pan of oil right beside the solvent, and as soon as you remove the chain from the first pan, soak it in the oil for a while. This will replace the lubricants lost in the gasoline, and will give the rust no chance to form on the link pins.

We can't stress enough the problems of washing your motorcycle with the chain still on it. Every test bike that ever gets a bath from one of the DB crew gets its chain stripped off right away and thrown into a pan of oil to soak. If you do wash your bike with the chain on it (and you're a fool if you do), then be sure not to spray chain lube on it right after the washing. As we said earlier, that will trap all of the water inside the bushings, and it will rust the innards out of the links.

Trail tips and breaking points

No matter how well you maintain your chain, one rock can put you out of a race in a fraction of a second. And when the chain is thrown from a rock

wedging in the wrong spot, nine times out of ten it twists the chain. That can be a big problem if you're unprepared for such a mishap. But with a little perseverance, the twisting of the chain or shattering of the links can be conquered in a matter of minutes, and you'll be merrily back on your way again.

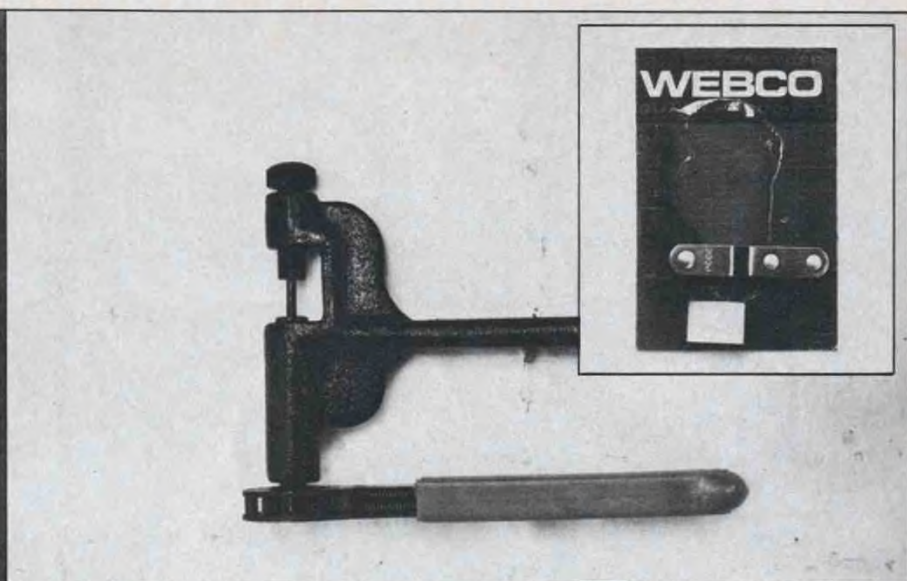
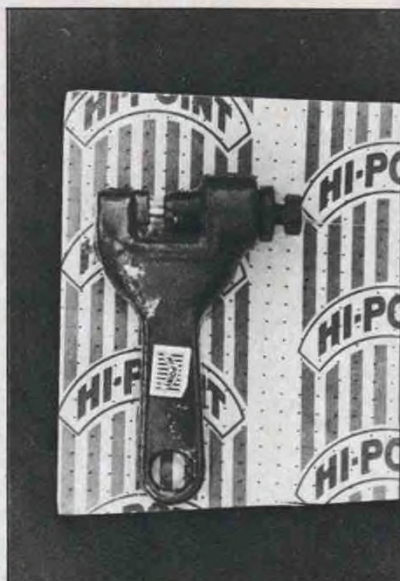
First, in order to battle back against nature, you have to arm yourself. In your toolbox or tool bag, pack along a chain breaker, about four to six inches of chain, several master links, a half link or two, and most importantly, a few feet of good safety wire. This list looks easy enough, right? Well, it's got a little bit of a twist to it, too, if you don't know what you're getting.

Before you buy any of these things, go out to your bike and examine the chain. Take note of the brand, the size, and any other identifying numbers on the outside of the sideplates. Why? Because not all chains are alike. And when not all chains are the same, you'll need different chain breakers, master links and half links. The only thing universal about the size of a chain is its pitch, and the fact that safety wire can work on any size.

First, we'll examine the difference in chains. Although the pitch is the same, as well as the roller, the sideplates and link pins differ greatly. For instance, Sudco's Tsubaki chain has thick sideplates and beefy link pins, while the Daido DID or Diamond chains are thinner at the walls and skinnier on the pins. Thus, if you tried to stick a DID or Diamond master link into a Tsubaki chain, it would fit, but it would be so loose that the chain could snap it. On the other hand, a meaty Tsubaki link would not fit into the hole of a Diamond or DID chain.

The same rules apply not only for the master links, but for the half links and the hunk of chain we recommend that you take along. Make sure you know what you're running, and get the same brand of chain and links from your shop. If you have a private label chain, such as the Hi-Point racing chain, check the box to see who manufactures it. In the case of Hi-Point, it is a Tsubaki brand chain, but there are others. Check them out before leaving for the bike shop.

As for the chain breakers, there are several types of those, too. Each is made for a specific chain, due to the link pin thickness. Sudco and Hi-Point manufacture high-quality chain breakers for the Tsubaki chains, while Webco has a variety of other breakers for DID chains. The Hi-Point breaker, called the Chain-A-Part, is a cast wrench body with a threaded top and bolt-headed pin screw, which, when cranked around with a wrench, drives the pin down through the chain and



Some of the better chain breakers are the Hi-Point Chain-A-Part, the Sudco/Tsubaki breaker with a built-in ratchet, and the Webco breaker. For the tool pouch, get a little beaver-tooth.

separates the links. As for the Sudco Tsubaki breaker, it has a ratchet handle built right on to the body, and all you do is batten down the handle, slip the chain in and drive the pin right out without pulling another thing out of your box. The Sudco breaker is too large for an enduro bag, but the Hi-Point chain is small enough to fit inside with the heftiest portable chain breaker you can comfortably pack along.

Webco's chain breakers are both permanent and portable. Their bigger breaker is designed to stay at home or in the toolbox, but they have what is called a "beaver tooth" breaker, which many enduro and desert riders carry along religiously. This beaver tooth is a very small piece of cast metal with a threaded top and a little combination pin-push bolt in the threads. This allows you to break the chain with the end of the bolt you're turning with the wrench, which keeps its size small and saves you room in the tool bag for other necessities. The only problem we've found with them is that if your chain is a tough one to break, the beaver tooth may strip its threads before pushing the pin through.

Now that you've got the right breaker, extra inches of chain, master and half links and safety wire, what do you use them for? They are all basically devices to get you back on the trail again, and back to the pits without a long walk or push.

If a rock should fly up and either break a link or twist the chain, get out the breaker and get to work. If a link is broken, first see if you can make use of a master link by pushing another pin out of the link beside the break. If not, try to slip in a half link and a master. Remember, the half link is the weakest link in a chain, so if you have to use one, go careful with it.

In the event of a twist, you have to know the facts before you can properly fix the chain and get going again with a chain as strong as the one you started with. Usually when a chain twists, there is a main link that has taken all of the stress, along with a few more lengths at each end. Remove the chain, examine it and find the twisted link, then go to each side of it and see just how far it goes. Measure that distance up with the hunk of chain you have in your bag, and break off the number of lengths you need from the new chain, minus one or two. The minus is because in order to reconnect the chain you will also need to use two master links, one at each end. With the new hunk of chain and the master links, break off the twisted links and install the new section. This will get you rolling strongly again. At about 15 minutes of riding after the chain surgery, stop and readjust the chain. The new links should have finished their preliminary stretching by then and you can accurately tighten it to last you the rest of the ride.

There are always going to be times when neither preventative nor repair maintenance will do the trick and get your broken chain back in one piece. In such a case, you'll be thankful that you brought along the safety wire. Take the broken chain and wrap it back around the sprockets, with the shattered links facing down. Cut a strip of safety wire a couple of inches long and wrap the piece through the inside and outside parts of the rollers of each end link. This will form a link-type connection between the rollers, and will connect the chain. When you begin to take off with such a rigging, push the bike until it is rolling smoothly, then carefully get on. Take it slow and easy with the wire, and it should take you anywhere from a few hundred yards to a mile.

After that it will probably snap, in which case you stop immediately to keep from wrapping up the chain, and replace the piece of wire with a new strip. This can get you from the middle of nowhere back to the pits, with just about a foot or two of safety wire.

Wrapping it up

By now you should know a lot more about chains, how they work, and how to keep them working for a long time. The chain is just as important as the motor that drives it, for without that link from the motor to the rear wheel, you aren't going anywhere. The care and maintenance of a chain is not that difficult, and takes only a fraction of the time used to fix a top end. If you keep your chain running smoothly and efficiently, you'll eliminate a lot of hassles later on down the trail in new chains, sprockets, and busted cases.

Where to get it

Daido (DID) and Diamond Chains, at your local motorcycle dealer

Tsubaki Chains

SUDCO INTERNATIONAL
1824 East 22nd Street
Los Angeles, California 90058

HI-POINT RACING PRODUCTS
9604 Oates Drive
Sacramento, California 95827

Chain Breakers

Hi-Point Chain-A-Part
HI-POINT RACING PRODUCTS
9604 Oates Drive
Sacramento, California 95827

Sudco Ratchet Breaker
SUDCO INTERNATIONAL
1824 East 22nd Street
Los Angeles, California 90058

Webco Chain Breakers
WEBCO MOTORCYCLE
ACCESSORIES
P.O. Box 429
Venice, California 90291 □