

MAY 1978

Motor cycling

MONTHLY

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TYRES! EXTRA 8 PAGE SPECIAL FEATURE

TESTING :-

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KAWASAKI Z200
KAWASAKI KL250**

**YAMAHA XS250
STRIPDOWN
HOW & WHY
FUELS**

FREE
**TYRE
DEPTH
GAUGE**

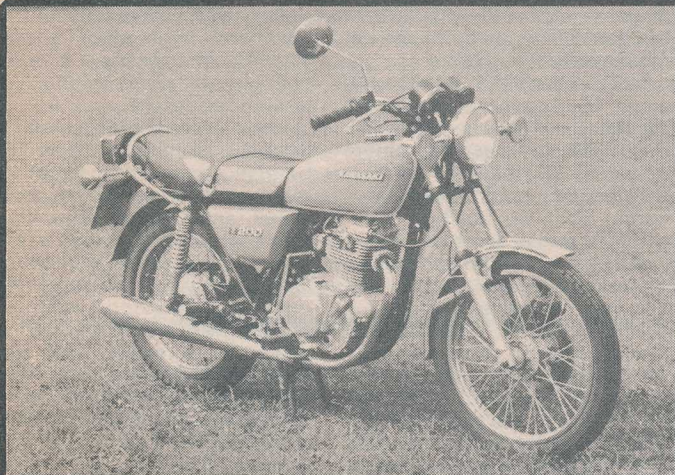


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MAY 1978 No. 31

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Road Impressions — a snazzy mid-range commuter

Editor: **John Thorpe**

Section Editors:

Brian Wilkins
Art/Production

Charles Deane
Features/Technical

Feature Writers:

Geoff Carless
Neil Millen
Merril Boulton

Sen. Tech. Artist:

Arthur Saluz

Sub-Editor:

Janine Turner

Editorial Sec:

Diana Simmonds

Adv. Manager:

Keith Price
(01-261 6731)

Class. Adv. Dept:

Room 2337
King's Reach Tower,
Stamford Street,
London SE1 9LS
(01-261 5762)

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TREAD CAREFULLY

YOUR 8 PAGE GUIDE TO ROAD TYRES



★ How to choose the tyres that suit your bike, your needs, and your pocket. Don't buy more or less tyre than you need

★ Get the best from your tyres under all conditions, and look after them so that they will look after you

★ Tyre removal, fitting, and puncture repairs. Don't be put off – It's easy if you do it the right way. Tubeless tyres, too

★ Four motorcycling men from Fort Dunlop. One designs tyres, one markets them, and the other two ride out and test them. They pass on their experience as they talk about tyres

★ Are your tyres legal? Common sense should warn you long before you break the law, but we run through the regulations just in case

★ No matter how good your machine is, it has still got to go through the tyres to get to the road. Handle that performance with safety, tread carefully

TODAY'S motorcycle tyres allow us to make mistakes without knowing we've made them — and live. Even the wet-weather grip of Japanese tyres, which we are all fond of criticizing, is only poor when compared with the best from Europe.

There have been very few radical changes in tyre technology, none of them recent. High-hysteresis rubber was a big step forward, but that was 15-20 years ago and so all of today's tyres use it. Bike tyres are still all cross-plys. Radials, which have taken over in the car world, have flexible sidewalls — and it doesn't take much imagination to realise that bikes won't handle too well on squirming rubber.

In the car world, tyres not only grip better than they used to — they last longer. The flexing radial sidewalls absorb many of the movements that would otherwise make the tread shuffle around on the road and the less the tread shuffles, the less it wears.

Although radials were out of the question for bikes, some car tyres used a half-way construction that had possibilities. A bias-belted tyre is a cross-ply tyre with a layer of radial cords under the tread, but not in the sidewall. These radial cords brace the tread, holding it flatter on the road and reducing shuffling. Thus the tread grips, not slips.

The drawback had been that the extra layer makes the tread area thicker, so there is more work being done in the rubber as it flexes, and this can lead to overheating. Cars get over this problem by using steel cords to dissipate the heat. However, bike tyres need tread that extends onto the sidewall, for cornering, and it is awkward to work steel cords into this shape. Recently, a new cord material was developed which is easily worked and can also dissipate heat, and so the Dunlop Red Arrow was born.

Red Arrows cost more but they offer you a choice. The extra grip means less tread shuffle and therefore longer tyre life. Alternatively, you can use more of your superbike's power by cornering at higher speeds than were possible before, but then the Red Arrow will wear as fast as a conventional tyre.

All motorcycle tyres are a compromise between grip, water clearing ability, and tyre life. Racing tyres (slicks) get lots of grip in the dry by using soft compounds and putting extra rubber on the road, but can't clear water. If deep, water-clearing channels are cut in them, the soft-compound 'blocks' and shuffles about. Also, the tyre will overheat on a dry road. Tyre life can be extended by using harder compounds, but these have less grip.

In Europe we value grip, especially wet-weather grip, so our tyres wear out fairly quickly. In Japan and America, people expect their tyres to last a long time, which is why we think that Japanese tyres have poor grip.

Things have become even more complicated with the advent of today's superbikes. Not so very long ago Percy Tait's racing Trident, Slippery Sam, used the same tyres as roadgoing Tridents — TT100s. Triumph Tridents produced a very respectable 59bhp. Nowadays, even the Laverda Jota's 90bhp pales in comparison to the 105bhp of the Honda CBX . . .

That sort of power puts a lot of strain on the rear tyre. Tread blocks shuffle about so much that they overheat and start to disintegrate. There are three solutions: use harder rubber compounds, which have less grip; make the tread block more stable by having fewer water-clearing channels, so wet-weather grip is poor; make the tread block more stable by making the water-clearing channels shallower, so the tyre goes bald sooner. Who'd be a tyre designer?

The only other thing that is new on production roadster machines is the tubeless tyre, although it's been around for a fair time in the competition world. Tubeless tyres are now fitted to mass-production bikes, the Honda CX500 and the CBX1000.

The problem has been that of getting an air-tight rim. A good seal between tyre and rim has never been hard to

achieve, it is the rims that leak. Conventional, spoked rims are obviously unsuitable and one-piece, cast-alloy wheels are often porous.

When these wheels are cast bubbles tend to form where the wide ends of the spokes meet the rim. Honda have overcome this problem by using Comstar wheels, where a thin, airtight, cast rim is machined and then riveted to pressed-steel or pressed-alloy spokes.

Tubeless tyres are bound to become more sought after now that a major bike manufacturer uses them. Avon and Continental have supplied tubeless tyres for some time and the other tyre manufacturers are certain to produce suitable covers as soon as demand increases.

There's lots in it for us. Tubeless tyres tend to deflate slowly before the damage gets bad enough to cause a blow-out. Valves don't get torn out of tubes if the cover creeps under acceleration or braking. Safety is what tubeless tyres are all about.

Today's tyres offer a level of safety and roadholding which can cope with the most exotic of the superbikes. Tyres suitable for the lower-performance machines that most of us ride can be built to last longer, but even the superbike tyres last pretty well considering what we expect them to do.

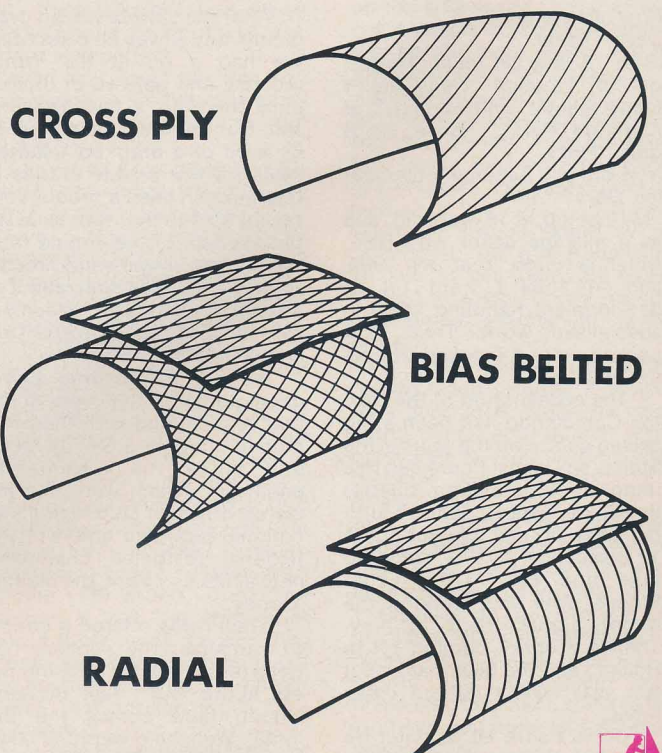
Tyre life depends mostly on you. Remember, tyres don't wear out on motorways. It's the acceleration, braking, and general screwing around the lanes that makes them work.

Choose the tyre which best suits your bike and the way you are going to use it. A 130mph tyre won't do anything for your 90mph bike, but it will cost a lot more.

Fit the size of tyre recommended by the tyre manufacturer. Different manufacturers may recommend different sizes for the same bike. This is because of the various profiles available. It is the air contained by the tyre which supports the load, and a low-profile tyre may need to be wider to contain the same volume of air as a higher-profile tyre for the same wheel.

The information on these pages will help you choose the right tyres, fit, use, maintain and repair them properly. Most of the major tyre manufacturers will be very helpful if you are still having problems.

If you are tempted to neglect your tyres, remember that your precious, delicate body is only separated from Mother Earth by that thin, black line.



COVER STORY



Neil Millen went to Fort Dunlop, in Birmingham, to talk to the men who design and test the tyres we buy

There were four Dunlop men around the table. All are motorcyclists, and so care about how their tyres perform as much as how they sell.

Steve Thrush is 24, quiet, a man who thinks before replying — the technician. As Designer, Road Tyres, he is part of the small team that designs all of Dunlop's tyres. Brian O'Ready is the man whose enthusiasm to tell me all I wanted to know about tyres had led to this interview. At 32 he is Manager, Motorcycle Marketing Division.

The stars of the show were Dave Rawlins and John Peters, Tyre Testers — and Dunlop's answer to Starsky and Hutch. They take their work seriously, but they enjoy it. John's greater experience and quick-fire wit make Dave the grinning straight-man for most of the jokes, although when John feeds him a line he never misses it. They answer each other's questions and finish each other's sentences, always with a smile or a joke. They are both married; Dave has three children and John has one. I began by asking them a bit about themselves and their work.

How old are you?

Dave "Thirty."

John "A little bit older. Work it out for yourself. There aren't many testers who've raced at Aberdare Park!" Pause for a grin. "Forty."

How did you become a tyre tester, Dave?

"My first job, at 18 years old, was as a mileage tester with BSA, which is rough. That was 1966, and in 1969 I went on to development, handling, MIRA — specialised work. Then BSA packed up and I moved to Norton Villiers.

"The acceleration of the Norton Commando had been a big selling point over the years in the States, so Dennis Poore had this thing about standing quarter times. We went to Santa Pod to get some figures. We got about 12.5 seconds for the standard bike and the ACU's Ernie Woods, who was working the timing lights, said 'Blimey. There's a sprint coming off in Holland and the bike that won it last year wasn't getting these times.'

"Denis Poore let us enter on condition that we didn't lose.

"After the sprints we did drag racing, and it was all a success. We had a go at the World records, and got two or three. I think there are a few standing, still. But the drag racing got to be a bit of a drag, so I started having a few private entries in road races. I used a production-racing Norton but, with what we had gained for the engine from drag racing, it was pretty smart. I rode in a Midland club, and that season I won the newcomers award and the production championship.

"We won all the drag racing championships that were going that season, and with the prize money I bought a Seeley frame and stuck the Commando engine in, which went like the clappers. I went club racing and national restricted, and I won the national restricted championship at Mallory Park, the Mallory Trophy.

"Then I was offered a couple of Yamahas. The sponsor had got a reputation for messing riders about, but I just thought: 'Great, here comes the Big Time'. Well, he'd want the bikes back after every race so there

was no time to prepare for the next. Then you'd turn up at his place before a race to find there was nobody there — no bike. So I said: 'If that's the way you want it, they're your bikes, you run them. That finished me.

"After that, I concentrated on Dunlop development — until last year. I went around a few of the circuits as part of the Dunlop service team — not riding, in a talking capacity, part-time. This year I'll be back full-time, as a Dunlop Racing Service Engineer."

Congratulations on the promotion. How did you get started, John?

"I got into bikes in 1958. I'd had a few bikes before that, a Gold Flash being the biggest. I went to work for Veloce, as I remember it. I was in the repair shop, doing the service repair work.

"Just before I left I'd done myself up a Venom to race. It was basically standard, dead reliable, not very quick, but you could go all over the country, racing, and not put a spanner on it. I used to take it apart to see why it hadn't gone wrong . . .

"I rode it at most circuits in the country — I've ridden it in the Manx. At the end of that race I reckon the bike could have done another couple of laps, but I was knackered . . . I finished, but I could have finished higher if I had pushed myself more. The intention was to go back and do better the next year, but I couldn't afford it.

"I went to some funny circuits you've probably never heard of. I raced round the rhododendron bushes at Aberdare Park — flower beds, park seats, it was good fun.

"I joined Dunlop in 1961, and kept racing the Velo up till about 1969. I couldn't afford anything else. I had a ride on Arthur Taylor's Ariel Arrow, Golden Arrow, and we were doing quite

well in the 1000km but the engine went sick about 50 miles from the end so we ended up about third.

"I crashed it, and broke my ankle, while I was working for Dunlop, and that made me feel a bit sick for a few months. I didn't ride a bike again, seriously, for about two years. You see, in those days there was only testing now and again at Dunlop — in the last five years we've been doing a lot.

"But I've raced against Hailwood. I've seen his back tyre lots of times. He passed me in the wet at Oulton Park once, leaning over at some incredible angle, and I thought: 'Ah, you'll fall off in a minute . . .' He didn't. He had me again about five laps later. He was an incredible bloke, Hailwood.

Dave and John, do you have bikes of your own?

Dave "Yes. A Yamaha DT175 Trail, for commuting and playing. I used to race a Yamaha TZ and was so impressed with the quality of that bike that I bought this one."

John "Yamaha XS250."

What tyres are they fitted with?

Dave "Original equipment Japanese Dunlop Trials Universal. I don't find them as bad on the road as some people. In the wet, the small blocks cut through the water. There are no problems as long as you treat them with the respect that dual-purpose tyres deserve."

John "Red Arrows. I would have fitted TT100s, because the bike doesn't have the performance to make use of Red Arrows, but the Red Arrows were lying around, and it fitted in with a testing programme."

As testers, what was your nastiest or most amusing incident?

John "I once fell off a copper's bike in front of four coppers. It was a police Honda 500T. Dunlop have lots of garages, in a row, at MIRA. At the last minute I realised that I was passing the one I wanted. I tried to turn, there was some gravel, and . . ."

Tyre testers Dave Rawlins (far left), who dramatically demonstrates his sprinting style in our colour page, and John Peters (left). They ride the tyres marketed by Brian O'Ready (right) and designed by Steve Thrush (far right)



Dave "Because we're changing tyres so often, we do our testing without security bolts. One day, when we were testing some competitor's tyres, I was cornering at about 100mph and the rear tyre went down. The valve had torn out. The bike went sideways, but I lived."

What does your testing comprise? Is it mostly mileage work?
John "No. It's mostly handling work. The biggest part is problem shooting, the rest being development."

Do you get any radically different tyres to test?

John "No. Mostly the changes are very small. A slightly different tread pattern or a minor change in compound."

Someone feels they have a handling problem. How should they separate a frame problem from a tyre problem?

Dave "If handling suddenly deteriorates, you know that something's happened. In that case, you can almost guarantee that it is the dampers or the fork oil — they are the main things to check first. Then start looking at the frame, but it's unusual for the frame to go wrong."

John "Also check swinging-arm bushes and head bushes, fork seals, wheel bearings. It's unusual for tyres to deteriorate suddenly."

The most likely time for people to suspect tyres is when they have bought a new tyre or set of tyres, expecting handling to improve, only to find that it is worse.

Dave "If they have replaced only one tyre, then the combination of a new front tyre with a worn rear is bad. Much better the other way around."

John "Some people, especially youngsters, stick the rear wheel back in any old how, probably adjust the chain, and forget about the other side; the wheel's totally out of line."

Dave "Another thing is that, sometimes, the recommended pressures in the bike's handbook are different to ours, so it's best to check with the Dunlop chart."

Brian "If you're changing to low-profile tyres (TT100s or Red Arrows) after the tyres fitted to the bike as original equipment, make sure you've got the right tyres, sizes, and pressures for your bike. Check with your dealer or with Dunlop."

"Then make sure that you fit it correctly, or that someone else

fits it correctly. Check that the pressures are set right, with an accurate gauge. Check that the front wheel is balanced. Then, after all that, if you still feel that the handling has deteriorated as a direct result of fitting the tyres, come and hang it round our necks.

"We don't let anyone go away dissatisfied. In the ultimate, we give them their money back. And, touch wood . . ." he did . . . we haven't done that yet." *Can you feel different ages of tyres, ie different tread depths front and rear?*

Dave "The extreme case is where you have an as-new front tyre with a worn rear. This can lead to a high-speed weave."

How do you get out of a high-speed weave?

John "Lie flat on the tank. Don't sit up and brake, all hell will break loose. Lie on the tank: the weave will die away. Then roll off some throttle and start breathing again."

Should you, then, swap the tyres front-to-rear to even out the wear?

Dave "With the TT100s on the Trident . . ."

John "Or the Velo!"

Dave ". . . or the Velo, then there's no problem because the front and rear tyres are identical — although you wouldn't want to put a worn-out tyre on the front. But most Japanese machines have 18in. rear wheels and 19in. fronts. Slowly they are going over to 18/18 but, even then, the tyres may be of different sections. The Red Arrows are 4.25/4.10."

John "In the cases where the front and rear tyres are identical, you could get more mileage out of them by swapping them around, yes."

When you two are testing, can you feel out-of-balance rear wheels?

John & Dave "Yes."

John "You get the back wheel hopping, usually."

Dave "Vibration as well."

John "Yes. You get vibration coming through the bike more than through the forks. If it's slightly out of balance you probably won't even notice it, but if it's out of balance by much . . ."

Most bikes now, especially the bigger ones with wide rear tyres, tend to follow white lines. It can feel quite violent, but is it?

John "Certain tyres are better than others for climbing white lines."

Dave "Yes, Japanese tyres are quite bad."

John "It isn't always white lines, it's any road imperfection. You see white lines and so, when you're crossing them, you expect to get some reaction, and you do or don't depending on how good your tyres are. But if you go over a road joint, which quite often you can't see, and you get a reaction you're not expecting, this becomes a little alarming."

Should you let it take the bike, or should you try to fight it?

John "I'll avoid a line, where possible. But, if I've got to cross it, then I allow for it as I go over. I know the bike is going to twitch a little bit, and I just let it happen. *Can tyres be too wide for a particular bike?*

Dave "This comes down to the correct fitment of tyres, the recommended fitments. It's like this character with a Honda, from Manchester, a 500 twin. He'd gone by somebody else's fitment chart and had a 3.60 on the front and a 4.25 on the rear. It was terrible."

John "Yes. He'd got a big difference, you see."

Dave "A fantastic difference. Big on the rear and small on the front. That really upset the handling. On somebody else's fitment rate, those were the sizes. All we did was put 4.10s front and rear, and it was perfect."

Steve "You could say that you can over-tyre the rear of a small machine or under-tyre the front of a big machine."

If people experiment with other-than-recommended tyre sizes, is that a bad thing?

Steve "It's dangerous to encourage people to vary from recommended fitments."

I presume that in no circumstances should you mix profiles.

John "Not necessarily."

Steve "Within limits, they should be the same."

Dave "With the Honda 400F, it used to be a TT100 on the front and K91 on the back. But we've got the K91 front, the 18in, now."

Brian "Two things make mixing profiles a common problem. The first is that Japanese original-equipment tyres are mostly high profile (100 aspect ratio). The second is that rear tyres wear about three times quicker than fronts, so the profiles stay mixed for the lives of three rear tyres."

Steve "It's not too much of a problem."

Dave "We tried a combination of

a triangular, racing tyre on the front and a rounded, roadgoing tyre on the rear. That was bad. It just wasn't on."

Steve "But there you had two extremes. I remember that case. The rear tyre was not only of a rounded section, it was very worn as well; it was nearly flat. So, you had a pointed front tyre and a flat rear. Triangulars were for racing only. You don't get those extremes on the road."

"Most Japanese front tyres — the ribbed-type tyres — tend to be fairly round in profile. A round profile is between the two extremes. Thus you could mix it with a TT100 on the rear, which is about the nearest tyre on the road to a triangular, or mix it with an Avon Roadrunner on the rear, which is a tyre with a pretty flat centre."

"But I wouldn't recommend something like a TT100 on the front and a Roadrunner on the rear, because there you have the two extremes in roadgoing tyres."

Should you lower tyre pressures in the winter?

John "I used to think so, but I've changed my mind. How often and how far do you ride on thick snow, when you may benefit — if you do benefit, and I'm not sure that you do?"

Steve "It's all very well if you're riding in trials, but on the road it's a different thing altogether."

Brian "It's a fallacy that pressures are adjustable on the road. In practice, people who put them up leave them up and people who put them down leave them down. The safe answer is: leave them alone. At best you'll get a marginal improvement in traction in thick snow, but the handling will go. On a motorbike you're playing with fire."

Dave "You get very little benefit on the side roads, in the snow, but it makes cornering a problem on the main roads, where the snow has been cleared."

If someone is going on a long trip should they weigh the front and rear wheels, with the bike fully laden, and work out their tyre-pressure increases from a load chart?

Brian "If they're going on a three-week tour of Europe with all their kit, yes. There are bikes around now which can sustain high speeds even when heavily laden."

John "Yes, in those conditions, heavily-laden touring, it would be a good idea. Work out your extra loads and adjust your pressures to suit. You could probably 'phone Dunlop . . . ?"

Brian "Yes."

John ". . . and say: look, I'm going to load up the bike with x and y extra lbs on the front and back wheels and I'm going to do 1,000 miles, do you think that an extra 6lbs would be advisable?"

Brian "Don't forget, when you get to your destination and unload the bike to do some local journeys, you must let the tyres down again."



Patch Work

Removing tyres and repairing tubes

Short story

THE dirtiest and most time-consuming part of puncture repairs is often removing the wheel. Even if the rear wheel is designed to come out without disturbing the alignment or chain tension, you may find that the exhaust system has to come off before the spindle can be withdrawn.

So, it can be worth having a look at your puncture to see if it can be repaired with the wheel in place. This is only possible when you know where the puncture is, so start by looking round the tyre for nails.

If you find the cause of the puncture, leave it in place until you have found the hole in the tube. Remove the valve core and then break the seal between the tyre and the rim all the way round, on both sides, by pressing the tyre bead right into the rim well. Use two tyre levers, a couple of inches either side of the known puncture, to lift the bead over the rim.

A third lever can now be used to work outwards until you have enough room to pull out the punctured portion of tube where, hopefully, you will be able to see the hole. Remove the cause of the puncture before replacing the repaired tube and easing the tyre back over the rim. Soapy water will make the whole job easier.

Long story

IF you don't know where the puncture is, or you're going to fit a new tyre or tube, then the wheel has got to come out and the tyre has got to come off.

With the tyre deflated, remove the valve core. Break the seal between tyre and rim, on both sides. Security bolt locking nuts should be unscrewed until they are held by the last few threads only. Push the bolts fully home.

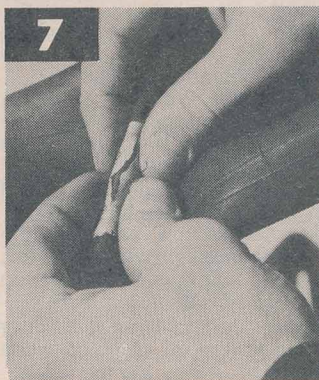
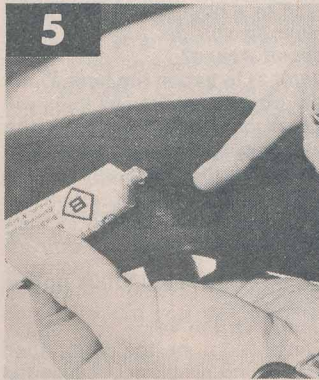
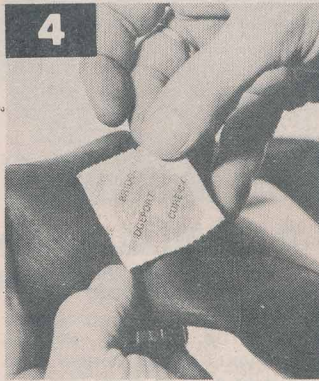
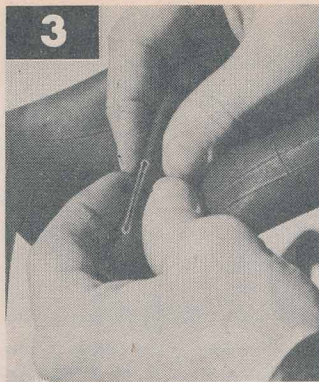
The job will be made much easier, and there will be less damage to tyre and tube if you use plenty of lubricant. Tyre fitters use a special lubricant, but a solution of washing-up liquid in water is just as good. Work this in between the tyre bead and the rim, all the way round.

Always start at the valve. Insert two tyre levers, one either side of the valve. A common mistake is to push the levers in too far, which is why the tube so often gets trapped. It is only necessary to get the hooked end of the lever over the bead.

Working in one direction, insert a third lever to free some more tyre. Remove the middle lever and free some more, and so on until you get right round to the valve again.

Remove the tube. It is also a good idea to remove the security bolts at this stage. Check that the rim tape is in good condition and that it covers all the spoke heads. It doesn't cost much, so replace it if it is tatty.

If the rim tape is to be replaced, or a new tyre is to be fitted, the old tyre has to be removed completely. Working from the other side, hook a tyre lever under the bead and over the rim. Bend the lever right back and knock the tyre off with a hammer (a rubber mallet is ideal) by hitting the bead near, but not on top of, the rim.



Tube repairs

HOME repairs of motorcycle tubes are permanent and safe as long as they are done correctly.

Surface preparation is all-important; follow the instructions. Tyres and tubes are dirty and your hands will get oily while removing the wheel, but the repair must be spotlessly clean and oil-free. Proper repair patches have delicately-bevelled edges and the rubber solutions supplied in motorcycle and car (not cycle) repair outfits are self-vulcanizing so as not to go tacky as the tyre heats up in use. Do not try to use an old piece of inner tube and some household adhesive...

Finally, the tyre may have been damaged as well as the tube. If the tyre is split, or if frayed cords are visible, it cannot be repaired; throw it away even though it breaks your heart.

First find your hole (1). A hole like the one shown is easily repaired but a split along the tube's seam, around the base of the valve, or alongside an old repair should not be attempted — buy a new tube.

The area around the hole must be clean. Remove oil and grease with a clean rag dampened with trichloroethylene, if you can get it, or petrol. Roughen the area around the hole with sandpaper (2). This is possibly the single most important stage. In the case of a split (3) pinch the tube on either side of the split and bevel the leading edges and ends. This keys the edges for a good bond thus relieving strain on the patch, and prevents the ends of the split spreading.

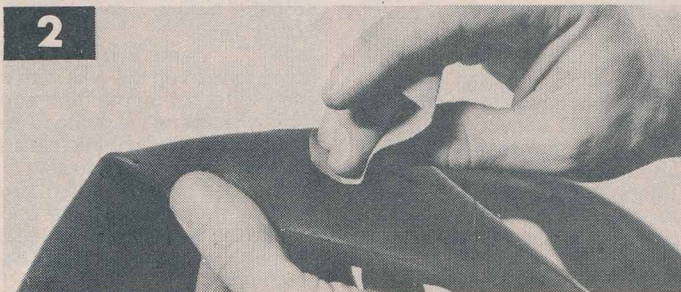
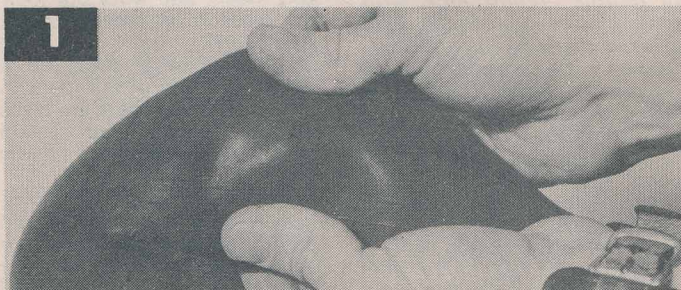
Choose a patch to fit the hole (4). The area of the patch should be at least three times that of the hole and, in the case of a split, at least one and a half times as long.

Prime the area around the hole with a thin layer of rubber solution (5). This should cover the whole of the roughened area, which in turn should be a little bigger than the patch. Apply the solution with a clean finger. Touch only the very edge of the primed area to check when the solution has gone tacky. When it has, apply another thin layer.

When the second layer is tacky, peel the metal foil backing off the patch. Press the centre of the patch on to the hole and then press the rest firmly down, working out from the centre (6).

Pinch the patch to crack the backing paper (7) and peel this off from the centre outwards. Take care not to lift the feathered edge of the patch.

The repair is now complete. If there is a large excess of rubber solution this can be lightly dusted with chalk, but don't be too generous because the chalk can harden and chafe the tube.



Tubeless-tyre repairs

TUBELESS tyres are only ordinary tyres with a layer of inner tube built in. Thus puncture repairs need the same technique as inner tubes, working from the inside of the tyre.

Having said that, you are strongly advised to do your own repairs only when a professional repair service is not available, and then only when the puncture is clean and simple.

The reason is that the tyre's carcass may be damaged but, because the cords are hidden by the inner-tube layer, a professional inspection is needed to detect the damage. Also, while surface preparation is still essential for an efficient bond, over-enthusiastic roughing can weaken the inner-tube layer.

There are, however, two temporary repair methods which will get you home or to a tyre depot. The first is to fit the tyre with an ordinary inner tube, which will take you as far as you like — although you should still have the tyre checked for carcass damage.

The second temporary repair method is to use a plugging kit. This method is convenient because the wheel and tyre stay on the bike, but you are then

limited to a maximum of 100 miles at 40mph. The plugs must be coloured red by law to show that they are only temporary repairs.

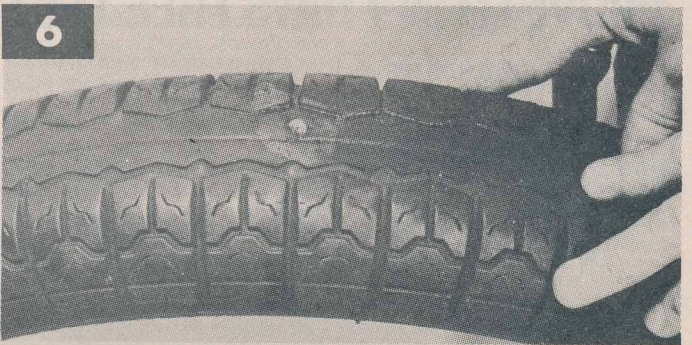
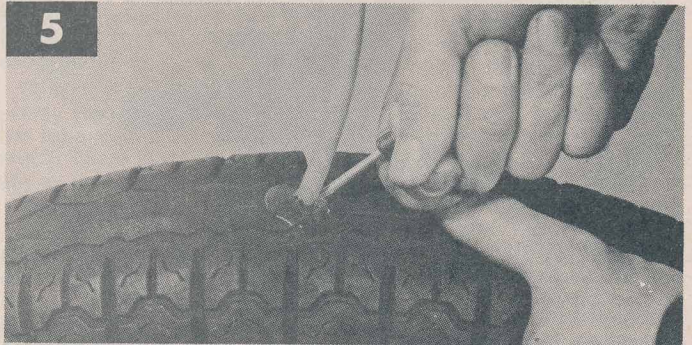
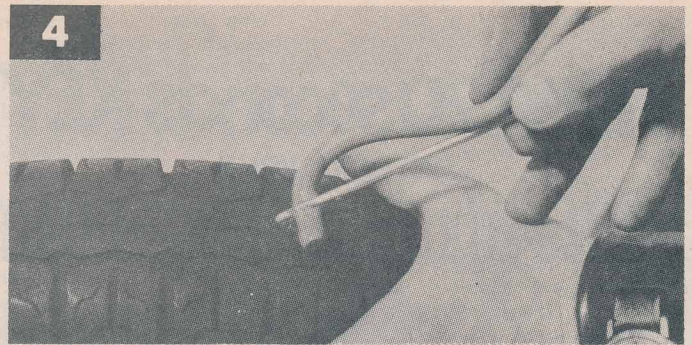
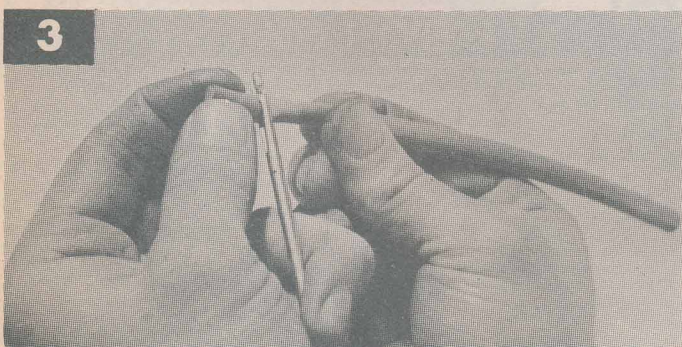
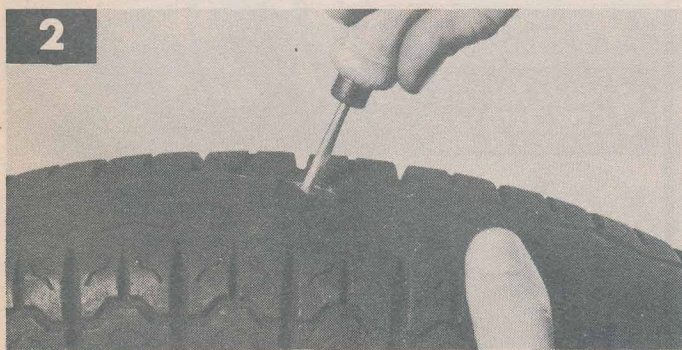
We used a worn-out tube-type tyre from our workshop to demonstrate how to use a plugging kit. We don't want all you eagle-eyed clever-Dicks writing in to point out our mistake . . .

Having found the hole (hopefully there will be a nail poking out) insert the probe supplied in the kit (1). This will check that the hole is clear and will tell you the angle of it.

Dip the thicker, hooked tool in the tin of rubber solution and then work it into the hole (2) in the direction shown by the first probe. Do this two or three times so that the hole is well lubricated.

Stretch and roll a plug into the hook on the tool, about 3/4-inch from the end of the plug (3). Dip the tool and plug in the rubber solution (4) and push them into the hole (5). The plug will stretch until you feel the short end emerge inside the tyre. Withdraw the tool; it will automatically release the plug.

Using a sharp knife, trim the plug flush with the tyre (6). If the plug is not cut flush, it may catch on the road and pull out.



Offensive Rubber

Common sense can keep you legal. Protect yourself, your licence, and your pocket with this guide to tyre law.

ANYONE who gets nicked for having tyres which break the law deserves it. A bulge in your tyre suggests a much smaller bulge between the ears, and leaning into a wet corner with less than 1mm of tread suggests a close affinity to lemmings.

Tyres which don't do what they are supposed to do — because of the condition they are in or because of the way they are being used — are illegal tyres. The Law only tells us what we should already know.

The Law says . . . It is an offence to use a tyre which is unsuitable for the use to which the bike is being put. This means that you don't run your road bike on slicks or speedway tyres. Also, the speed rating of the tyres should match the performance of the machine. Neither should you fit a tyre which is unsuitable when combined with the tyre fitted to the other wheel.

Tyre pressures must be correct for the use to which the bike is being put. Thus you must increase the pressure of the rear

tyre, or both tyres if necessary, to allow for a pillion passenger or luggage. Equally, you must lower the pressure when your passenger gets off.

For those of us daft enough to think of doing so, The Law says we mustn't ride around on tyres which are falling apart. These have a break in their fabric or a cut exceeding 25mm or 10% of the width of the tyre, whichever is the greater, deep enough to reach the body cords.

You've got to have at least 1mm of tread (clearly visible tread for bikes under 50cc) over at least three quarters of the tyre's width and all the way around. It used to be all too easy not to notice that your new tyre had become an old tyre, but not any more. Now you have your free Motorcycling Monthly tread-depth gauge so you'll never get caught out, will you?

You must not use a tyre which might damage the road surface or put those using the bike or the road in danger. Thus spiked tyres are out, even on icy roads.

Finally, you can't use a recut pneumatic tyre on a motorbike.

That, basically, is it. Most of it is commonsense and, if you are committing any of the above offences, the policeman who stops you is doing you a favour.

Look Mum - no levers!

Tyre fitting made easy — the hard way

MOST people hate fitting tyres, especially new tyres. Tempers get frayed, knuckles get skinned, the rubber covering the tyre bead often gets torn apart, the tyre levers (or screwdrivers) get bent. Then, when you come to inflate the final product, you find that you've nicked the tube in six places . . .

It doesn't need to be like that. The damage is done by the tyre levers, and they are unnecessary. We went along to Tooting Tyres, 646 Garratt Lane, London SW17, where they never use tyre levers to fit new bike tyres.

Kevin Caulfield showed us how it is done. Kevin is a big lad, standing well over six feet in his inner tubes, but he used no force while fitting the tyre shown. Tooting Tyres have apprentice fitters of the nine-stone-weaking variety (just a figure of speech, lads) and they can do it, no problems.

If you find yourself using force, then you're not doing it right. Even petite ladies should find that their biggest problem is the psychological barrier.

Pay attention to Kevin's tips and you can't go wrong. Next month, we show you how to fit new cylinder linings using only your teeth. Perhaps . . . !

BEFORE starting, check that the rim well is clear of excess muck or jagged edges. Fit a new rim tape if necessary, and check that it covers all spokes.

Lubricate all tyre beads (1). Kevin uses Dunlop lubricant, but a solution of washing-up liquid in water will do just as well. The lubricant is the secret to success.

If the tyre you are fitting has a direction-of-rotation arrow, make sure it points in that direction. Press the bead down over the rim all the way round (2).

Replace any security bolts if they were taken out when the old tyre was removed. Replace their

nuts by a few threads only.

Dunlop tyres are checked for balance before leaving the factory. Three white dots on the bead mark the lightest spot (3). These should be adjacent to the valve.

New tubes are flat (4). Remove the valve and inflate the tyre slightly to give it some shape. This makes the tube less likely to get trapped.

Press the tyre down with your knee (5). Thread the valve stem through the rim and replace the knurled valve-stem nut by a few turns only. The tyre will pop back over the tube.

Stuff the tube into the tyre evenly all round. Try not to get the tube folded or twisted too much. There is no need to put any air in the tube at this stage.

Make sure the tube has gone over the security bolt flanges (6). If you have been a bit slow so far, the lubricant may have begun to dry up. Work some more in between the wheel rim and tyre bead.

Starting directly opposite the valve, press the tyre down over the rim with your hands (7). Work equally in both directions (8). Aim to end up at the valve.

Push in the security bolts as you pass them (9). This makes sure that the tyre bead goes under the bolt flanges.

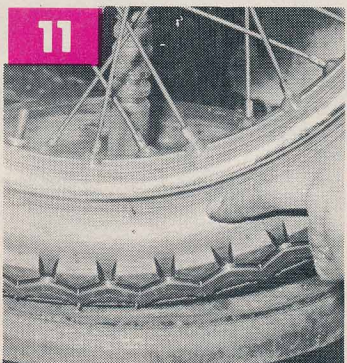
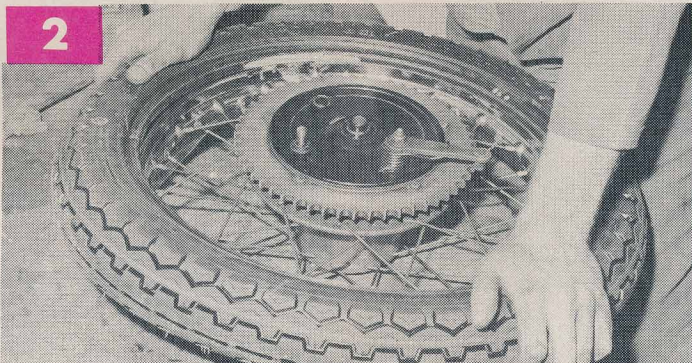
Now only the last few inches remain. Apply some more lubricant if necessary, then push the valve stem in so that the tube does not get trapped (10).

The last portion of the tyre slips over easily. Make sure the security bolts and valve stem push in freely. Check that the tube is not trapped between the bead and rim.

Screw in the knurled valve-stem nut hand tight. Replace the valve core. Security bolts should pop out as the tyre inflates. If they don't, let the tyre down and check the tube is not trapped beneath the security bolt flanges.

Inflate to recommended pressure. Bead lines will align with the rim if plenty of lubricant was used (11). If not, inflate to 50psi and then reduce to the correct pressure.

Check the valve is not leaking by smearing soapy water over the end and watching for bubbles. Replace the valve cap, and tighten the nuts on security bolts. Do not over-tighten. The pressure of one finger is sufficient. Piece of cake, wasn't it?



Tyre Care

Prevention is better than cure

MAINTENANCE is worthwhile but, ultimately, tyre life depends on your driving style. Tyres don't wear quickly in straight lines, even at motorway speeds. It's ear'olin' round country lanes that does the damage. That costly black stuff is left on the road every time you accelerate, every time you brake, and every time you bank over hard into a bend.

Which is not to say that we advocate that everyone should drive like a sunny Sunday in Dorset, just that you must be prepared to pay for your fun by wearing out more tyres. Except for new tyres, that is.

New tyres should be run in, just like new engines. There is no need to limit your cruising speed but acceleration, braking, and cornering should be done gently for the first 100 miles. This will allow the fitting lubricant to disperse (otherwise the tyre will creep) and will break-in the initially-smooth surface.

Even if you are willing to accept the reduced tyre life that hard riding will give, sensible riding can reduce the risk of concussion damage. Riding over kerbstones (1) or plunging into potholes (2) can break the tyre's carcass, and that means a replacement tyre.

It only takes a few minutes every week to remove the small stones which become embedded in the tread and the rubber (3). These should be gently prised out with a screwdriver — don't dig holes in the tyre. If left in the tyre, they can cut their way right through to the carcass.

This once a week check will often unearth a nail which hasn't yet caused the tyre to go down. It's much nicer to repair the puncture in the comfort of your own home rather than later on, in the rain, in the middle of nowhere.

The load on your tyres is supported by the air inside them, not

by the rubber. An under-inflated tyre can be easily damaged, will wear quickly on the outside edges of the tread, and will handle like a pig. An over-inflated tyre will wear quickly in the centre of the tread and will give poor roadholding.

Pop-up pressure gauges are very accurate and only cost about £1 (4). The pressure gauges in garage airlines are notoriously inaccurate and should always be double-checked. Always check tyre pressures when the tyres are cold. A short trip round to the local garage won't heat up the tyres, but longer trips will. The pressures quoted are cold-tyre pressures and they allow for the tyre heating up in use.

Always carry your gauge with you so that you can re-adjust your pressures when your passenger gets off or when your holiday luggage has been unloaded.

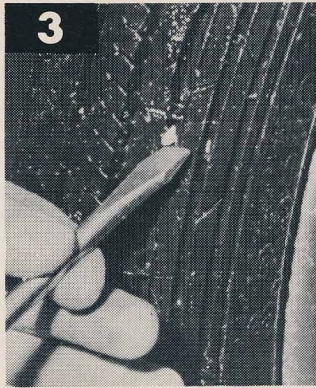
Storage

BEYOND putting the bike on its centre stand and making sure that it isn't standing in a pool of petrol, a bike that isn't going to be used for a few weeks needs no special attention given to the tyres.

If the bike is to be laid up for months or years, then you should go to a little more trouble. First, remove the load on the tyres by putting the bike on blocks, to get both wheels off the ground, and then let down the tyres.

Better still, remove the tyres from the wheels and store them in black plastic bags. This is particularly recommended if you live by the sea, where the high level of ozone in the air can age a tyre more quickly.

In either event, always store tyres out of direct sunlight. Avoid excess heat, excess cold, petrol, and paraffin.



Safe at any Speed

TYRE performance must match engine performance. A tyre which is designed to give maximum grip at 70mph, in the rain, on a light machine, will overheat and fly apart at 110mph, on a dry motorway, fitted to a superbike loaded with luggage.

On the other hand, fitting a 130mph tyre to a commuter bike will cost you a lot of money and give no improvement in tyre performance.

Rating Performance	
R Sustained speeds up to	95mph
S Sustained speeds up to	113mph
H Sustained speeds up to	130mph
V Speeds in excess of	130mph

How high do you rate your tyres?



Put on the pressure

AIR costs nothing and is easy to get hold of, yet many people make poor use of it. They will spend lots of money on good tyres and fancy rear dampers, only to turn a good-handling machine into a pig by failing to get the tyre pressures right.

The load on a tyre is supported by the air it contains. Therefore, an under-inflated tyre can't support its load and so its sidewalls will flex — imagine what happens when you throw a bike into a corner on flexing sidewalls. At the same time the tread will tend

to bow in at the centre, so there is less rubber on the road, which means less grip. The shoulders of the tread will be taking more than their fair share of load which, combined with the flexing sidewalls, can lead to overheating problems. Altogether a sorry little tale.

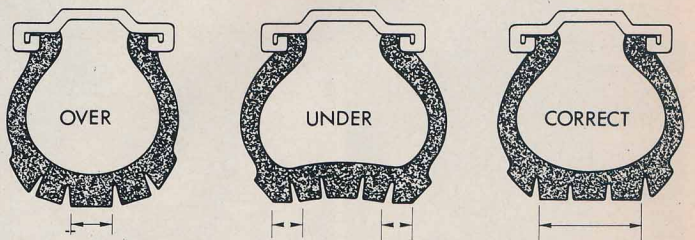
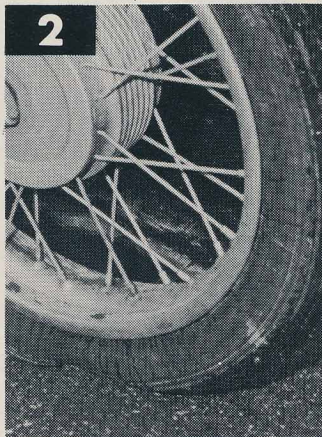
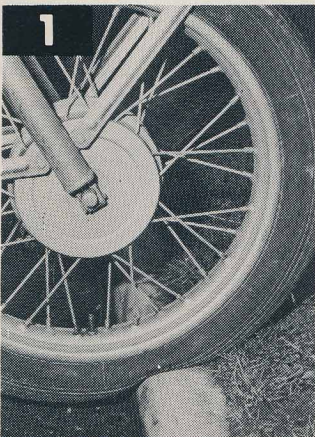
An over-inflated tyre is, at best, the lesser of two evils. The ride may become harsh and the tread will tend to bow out at the centre which, again, means less grip. Also, since most of us spend most of our time in between corners the centre of the tread wears out first — an over-inflated tyre will go bald at the centre even sooner.

So, check that your pressures are those recommended by the tyre manufacturer, and adjust them before and after carrying a pillion passenger or luggage.

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IN NEXT MONTH'S ISSUE:—
Tyre Buyer's Guide





GET WHAT YOU WANT OUT OF LIFE

These hand painted metal flake helmets come from sunny California. (It should be Colourfornia.)

They're not only eye-catching, but they pass BS2495(HP)1977 comfortably.

But what else would you expect with four tough layers of glass fibre and a 25mm thick styrafoam inner lining, to say nothing of a shatter-proof Lexan® visor?

At just under £40, they're at the top end of

the Life range of over forty helmets.

But no matter which Life helmet you fancy, plain or decorated, full face or jet - no matter if it costs a mere £10.99 - it's sold with a free replacement guarantee against accident damage.

That's one of the joys of Life.

LIFE®