

RENOLD

Chain care for the motorcyclist

Chain drive is the established method of transmitting power from the motorcycle engine via the gearbox to the rear wheel. The modern roller chain is a high precision product but proper maintenance will greatly enhance its life and performance.

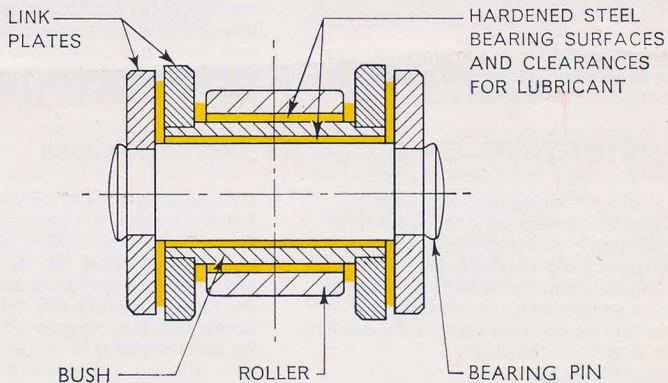
LUBRICATION—Primary Chains

Every joint or "articulating point" in a chain is actually a plain bearing of steel to steel on hardened surfaces. It is essential that a film of lubricant is at all times present to prevent actual metal-to-metal contact, this film not only cutting down friction to negligible proportions, but also assisting in cushioning the drive, in effect, hydraulically.

The oil-bath chaincase which is standard on virtually all machines other than those specifically designed for road racing, ensures that the high-speed primary chain is fully

protected and provides for lubrication in the most efficient manner.

The only attention required is to check the case periodically to ensure that there are no oil-leaks (as from unserviceable gaskets or loosened flanged joints). External cleanliness of the case is indicative of a well-maintained machine and is ensured by correct assembly of packing washers and properly tightened screws. The oil level must be adequate to submerge the lower strand of the chain when checked with the machine on an even keel.



The oil must be changed when it becomes dirty or sludgy. Frequency of changing depends largely on the design of the clutch: if this runs in the oil, the makers may recommend draining and refilling at intervals of 1,000 miles or so. Where the clutch runs dry, longer mileages can be run before changing. The importance of maintaining the correct oil level in the chaincase cannot be over emphasised. A very minor leak will allow the level to fall below the chain in

quite a short time. Even though some oil may be present in the case, the chain will run dry, with the inevitable result of rapid wear of both chain and sprockets.

An early indication that the chain is being starved of oil is the appearance at the joints of a reddish-brown deposit, and this should be taken as a warning that there is something amiss with the lubrication.

LUBRICATION—Rear Chains

The rear driving chain nearly always runs semi-exposed, its protection comprising usually a guard over the top run, with the addition of side valances on some machines. This drive runs of course at only about half of the primary chain speed, but carries a heavy bearing loading (varying according to the gear engaged) which must be catered for by adequate lubrication if excessive wear and friction are to be avoided.

Many machines incorporate as standard a metered oil feed to the rear chain, usually from the primary chaincase oil supply. The feed is controllable by an adjustable valve. Once set properly, so that sufficient oil is delivered to the sideplates of the chain without an excess finding its way on to other parts of the machine, this device is generally adequate.

When no such automatic lubrication device is provided, periodic hand lubrication of the chain is essential to prevent premature chain wear. For this purpose, oil should be applied to the chain whenever it appears dry, the oil being directed primarily at the roller and link edges to ensure as much penetration as possible to the internal working surfaces of the chain. Although oilcan application of normal oil may be employed, it is strongly recommended that the new chain lubricant in aerosol form, formulated after extensive joint research between Renold and Duckhams, should be used. The spray should be directed on the inside run of the chain.

The lubricant, applied in this manner, ensures optimum penetration, resists any tendency to drain or drip from a stationary chain, resists

centrifugal "flinging" as the chain negotiates the sprockets and "winds in" to the pin/bush/roller clearances when in motion, minimising wear in these important areas. It is obtainable from Renold distribution centres, motor cycle dealers and garages.

Periodically, the chain should be removed, washed in paraffin and, after allowing the paraffin to dry off, immersed in chain lubricant which has been heated in a container until liquid. After about ten minutes' immersion, during which the chain is moved about with a stick to "work" the joints and ensure penetration of the lubricant, the latter is allowed to cool with the chain still in it. After cooling, the chain is removed and the surplus grease wiped off. The chain can then be refitted to the machine after cleaning the sprockets. It should be noted that not all greases are suitable for heating to thinness without deterioration, and when purchasing, the purpose for which the lubricant is required should be stated, as special types are marketed for the job. Alternatively a heavy oil of SAE 140 grade may be used.

A modern and welcomed trend is the provision of complete enclosure for the rear chain. This not only keeps the chain clean and free from road filth, and so greatly increases the life, but also when automatic lubrication is incorporated the maintenance called for is negligible. When lubrication is not automatic all that is required is the application at about 1,000-mile intervals of a soft grease or heavy gear oil, well brushed into the chain joints. This mileage figure should be halved in the case of high power "superbikes".

LUBRICATION—Chains on Racing Machines

Machines of road-racing type with exposed primary chains require a continuous fresh oil feed by a properly designed drip-feed fitting. A rubber tube conducting oil or oil-mist haphazardly to a point on the lower strand of the chain is useless as it is likely to put far more lubricant on adjacent parts of the machine and rider than on to the chain.

The correct type of drip-feed fitting utilises a separate oil tank of about half-pint capacity feeding by gravity to a twin-feed oiler arranged to drip the lubricant on to the edges of the

links on both sides of the chain. The oil is fed to the chain at a point inside the bottom run, as near as possible to where it engages the clutch sprocket, the actual feed pipes having rubber tips for the last inch or so. For races exceeding 100 miles in length, a similar drip-feed arrangement is desirable for the rear chain.

The basic requirements are as detailed for the primary drive, it being obviously essential to adjust the feed so that there is no danger from surplus oil on the rear tyre.

CHAIN MEASUREMENT

If all other items concerned with the power transmission are correct, too rapid a rate of chain wear is invariably caused by inadequate

lubrication. It is useful to know the extent of wear, and a simple test for this consists of measuring the chain with an ordinary foot

rule, steel for preference. Wear up to $\frac{1}{4}$ in. per foot of chain length is accommodated by the depth of hardening of the bearing surfaces and when this limit is reached the chain should be replaced.

With a new $\frac{5}{8}$ in. pitch chain, 16 pitches will come to the 10 in. mark on the rule, and a sufficiently accurate check for subsequent wear is to take a limit of $10\frac{7}{32}$ in. for 16 pitches. In the case of a $\frac{1}{2}$ in. pitch chain, 23 pitches will come to the $11\frac{1}{2}$ in. mark on the rule and the limit of $11\frac{3}{4}$ in. for 23 pitches should be taken as the maximum permissible wear. For a $\frac{3}{8}$ in. pitch chain, 24 pitches of a new chain will

CHAIN ADJUSTMENT

A new chain takes a little time to bed down, and during this period will require adjustment. After this, oil-bath enclosed chains will run for a long time without further attention, but exposed drives will call for more frequent adjustment, and periodical checking is necessary. Correct adjustment is determined by the degree of up-and-down movement of the chain midway between the sprockets, average figures being:

Primary chain $\frac{1}{2}$ in. Rear chain $\frac{3}{4}$ in.

Magneto and similar $\frac{1}{4}$ in.

Very fast machines with open primary chains may require special consideration; an initial $\frac{1}{2}$ in. may be insufficient to ensure free running throughout a long race, and rather more slack should be allowed if experience shows this to be necessary. In all cases the adjustment should be checked at different positions of rotation, as slight variation may be found; any error

come to the 9 in. mark on the rule, and the limit of $9\frac{3}{16}$ in. for 24 pitches should be taken as the maximum permissible wear for this size of chain.

Naturally, the test should be made carefully to obtain an accurate result. The chain is first washed in paraffin to ensure that all joints are free, and laid unlubricated on a flat board.

If it is anchored at one end by a nail the necessary tension to pull it out to its fullest extent can be applied with one hand, while measuring between the centres of the bearing pins.

should be on the slack side rather than over-tightening.

On spring-frame machines, the rear chain tension will vary according to the position of the suspension travel. The suspension should therefore be held in the position at which the chain is tightest and the latter then adjusted to be just free at this point. If the manufacturer's instruction book gives specific details regarding this adjustment, these should be adhered to. Always re-check adjustment of any chain after final tightening of nuts etc.

It is preferable to leave the gearbox adjusting screws in the "hard-up" position, tending to push the gearbox forward. This will help to resist any tendency for the gearbox to "creep" backwards (and thus tighten the primary chain) due to rear chain pull.

CHAIN AND SPROCKET INSPECTION

Chain sprockets on a new machine should be correctly aligned but malalignment may arise in use. This may be due perhaps to slackened nuts, incorrect reassembly after say an emergency repair, or minor spills. A periodical alignment check is therefore desirable, and is most easily done when the machine is undergoing overhaul, as removal of adjacent components facilitates the job.

A straight edge across the sides of the teeth on the two sprockets should touch at four points, in any position of rotation of the sprockets. If the latter are in correct alignment, the inner plates of the chain will be slightly polished equally on their inner sides and this is not detrimental. However, if one side shows considerably more wear than the other it indicates that the shafts are not parallel (as viewed from above) or not in the same plane (as viewed from the back of the machine). If the inner plates on both sides of the chain show real wear as opposed to polishing,

particularly after a comparatively short mileage, it is probable that one sprocket is further out on its shaft than the other. This could be due for example, to wrong assembly of the engine-shaft shock absorber, or the clutch in the case of a primary drive, or to faulty assembly of the rear hub components, or incorrect rear wheel replacement, in the case of the final drive.

Sprockets which are excessively worn assume a "hooked" appearance, as shown.



When they are replaced check the new ones for accuracy. A new chain should fit completely round the teeth with a snug fit, neither too slack nor having a tight "springy" feel. The sprocket bore must be concentric, otherwise the chain will tend to slacken and tighten as the sprockets are rotated.

With the sprocket in position, a pointer fitted adjacent to the teeth edges will detect such faults, and if any show up, the sprocket should be ejected, assuming that the wobble is not caused by a bent shaft. Failure to correct such faults will cause the chain to wear quickly and unevenly.

The standard method of coupling a chain is by a spring connecting link, which is simple and effective. On normal touring machines it is completely reliable but nevertheless should

receive regular inspection, particularly in the case of fast roadster and sidecar machines where full power is often "turned on".

It may be advisable on such machines to replace the spring link at say 5,000 mile intervals, the reason being that, of necessity, the detachable plate on this link has to be a free fit, and under heavy load some wear must occur, thus throwing an undue proportion of the load on to the opposite (fixed) plate of the link. It is important to note that the closed end of the spring clip must point in the direction of chain travel.

For competition machines a riveted link should be substituted for the spring link in the primary chain. On racing types the rear chain should also be riveted. This procedure involves a little extra trouble, but is a worth-while insurance against losing a spring clip at a critical moment.

SPARES AND TOOLS

It is always advisable to keep a few chain spares, and the necessary tools, at hand. Not that roadside repairs will be called for with a well-maintained machine, unless some emergency has arisen; but it is sometimes desired to alter the chain length as when

gearing "up" or "down" for sidecar or competition work. The various chain spares available are shown. Avoid make-shift methods which result in damage; special tools are made for the job and these should always be used.



Inner Link No. 4



Outer Link No. 107



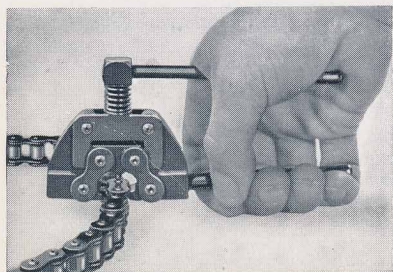
Connecting Link Single No. 26



Cranked Link Double No. 30

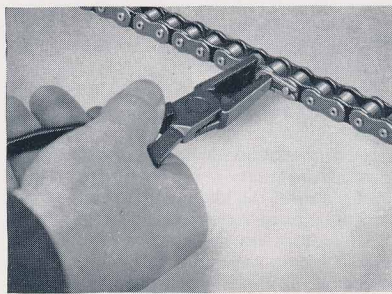
EXTRACTOR

Grip chain roller between jaws of tool. Turn extractor screw clockwise until tip engages end of bearing pin. Continue turning just sufficiently to force pin from plate. Repeat operation on bearing pin at the opposite end of plate. Detached parts should NOT be refitted.



PLIERS

To fit a spring clip, press on closed end with flat jaw of pliers, with grooved jaw engaging end of bearing pin. To remove the clip, press with flat jaw on the open end of the clip. The spares and tools described are obtainable from your dealer.



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