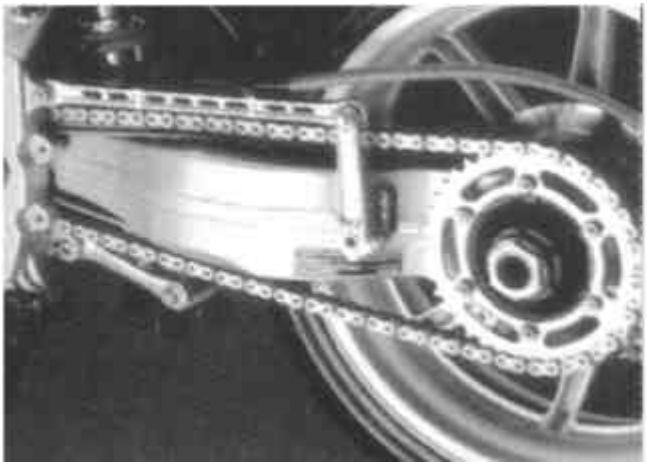

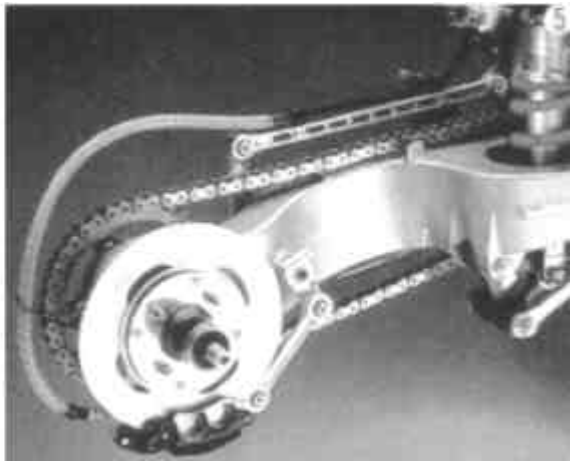

Chain drive single sided arm, interpretation by Honda. Note the levers each side of the arm just in front of the sprocket and brake disk, these take the torque from a floating brake caliper back to the main frame. Just like a normal floating caliper this gives control over the degree of squat. In order to mount the wheel bearings between the sprocket and disk the arm is quite complex in shape. This design necessitates a rotating axle which is large in diameter and hollow.

So it seems that structurally either style of swing arm could be made to perform quite satisfactorily, in which case the decision of which to choose would normally be based on other considerations. Ease of wheel changing would be a definite point in favour of the single arm, especially for endurance racing, but other considerations such as cost, ease of chain adjustment, ease of maintaining required manufacturing tolerances, styling, tradition and others would be taken into account.

Structural

Even though several very early designs of swing-arm suspension, such as the Moto-Guzzi and Vincent, were triangulated to give structural stiffness, this aspect seemed to have been largely ignored in the 1950s. and 1960s. when swing-arms began to become universal. Led no doubt by the Norton featherbed, most designs simply used a cross tube for the pivot with two relatively small diameter side arms. These lacked torsional stiffness to such an extent that Girling sold matched pairs of suspension struts as an after market premium option, to reduce additional twisting from unbalanced suspension.
It wasn't until Yamaha resurrected the triangulated design, around the end of the 1960s. and early 1970s., that due attention was paid to structural considerations. Since then swing-arm stiffness has gradually increased up to the present time.
Flexibility in this part of the structure allows the rear wheel to move sideways, creating slip angles and hence steering forces. The wheel can also twist out of the plane of the main frame which gives rise to lateral tyre forces due to changing camber thrust. As these steering actions are not under the direct control of the rider they can only be detrimental to handling and stability. As described in chapter 6, structural stiffness of chassis components in general has now reached the level that may cause problems with bump absorbsion when cornering, and some manufacturers have been deliberately reintroducing some compliance.