

**Greetings all.**

Depending on their mass, shape and designated lifting points, certain loads will require multiple rigging attachment points to ensure they can be lifted safely and effectively. This means more ‘Legs’ and whether they are chains, synthetic or wire rope slings, the goal is to ensure the load distribution is understood and within capacity of each leg.



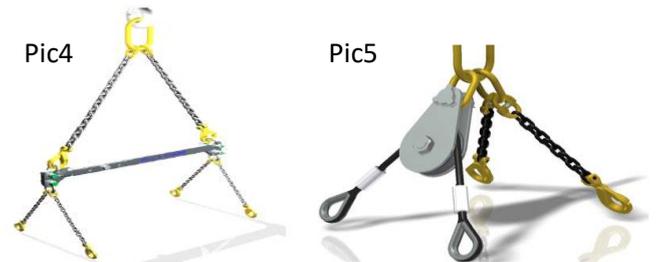
Many loads, such as the crane above, can be subject to flexing, an off-set centre of gravity (COG), and dimensional inconsistencies in the positions of the lifting points be it purpose designed lugs or general rigging. This can make it difficult to ensure all points are on the same horizontal plane or distance from the hook. On some loads this is clearly evident, but on others, the variance may not be clearly visible so equalisation can never be guaranteed. As such, in a 4 leg rigging assembly, two legs must be sufficiently rated to support the load.

Some years ago, tests were conducted by [A Noble & Son](#) (refer attached) using load cells on 4 different 4 leg equalisation methods. The results have shown that in a single point sling arrangement (Pic1), using equal chain lengths, the baseline measurements showed a load as high as 31% of the total load on a single leg. Removing a single chain link applied 47% of the total load onto one leg. There are a variety of ways to achieve load equalisation, but not all are as effective as others. The Nobles testing showed attaching 2 of the legs to each side of a rams horn hook (Pic2) is slightly better, but minor sling length discrepancies can still result in a leg taking 40% of the total load. The ‘Stinger’ arrangement shown (Pic3) is slightly better again. However, with a single link of chain removed, a single leg could be subjected to 34% of the total load.



The ‘Stinger’ is much less tolerant of larger leg length discrepancies and with a 5 chain link difference, could subject 50% of the load on one leg and remove virtually all load from another.

The spreader beam arrangement (Pic4), further improves on the ‘Stinger’ with only a 29.5% load on a single leg induced by removing one link. This arrangement has more benefits when a 5 link change is introduced creating 42% of total load on 1 leg as opposed the Stinger’s 50%. The spreader beam also acts as a visual clue that the loads are out of balance as it will skew towards the lugs underneath it with the greatest load.



The snatch block arrangement was the gave the best equalisation effect of the methods used and showed that from a very even baseline balance, 3 links could be removed with virtually no change to the maximum load on any leg.

The learnings are:

1. Never assume even length slings and symmetrical attachment points ensures equals even loads on the legs.
2. Rams horn hooks and ‘Stinger’ assemblies add little load equalisation and are not robust to leg length differences.
3. Spreader bars and snatch blocks are the best of the equalisation methods mentioned here.
4. Remember that when using a snatch block, the loads on the legs may be even but the load will tilt as a result to compensate for any dimensional asymmetry.
5. Remember to check all shackle, oblong ring, sling, and spreader bar capacities and If in doubt, seek an engineer to calculate load share and relevant loadings of each leg.

A full test write up from Nobles can be found [here](#)

*Stay Safe, CICA*