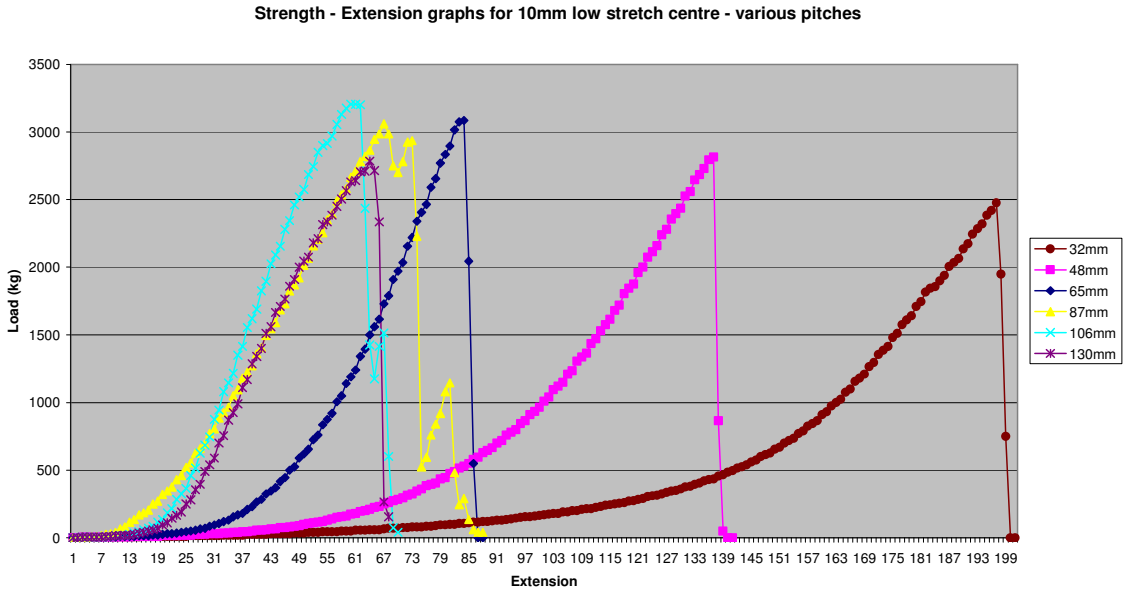
The effects of PITCH

The pitch of a braided rope is the advancement of the rope through the braiding machine in one complete revolution of the braiding bobbins. The length of the pitch determines the angle the fibres make to the pull on the rope.
Machines with more carriers, to get the same pitch angle, the pitch will become longer.
Pitch has a very large effect on the ropes characteristics; how easy it is to splice, the elasticity of the rope, flexibility and the durability. Long pitches make a rope less extensible and the ultimate minimal stretch would be to have all the fibres equally tensioned and straight however this would not be practical as the rope strands would tangle and there would be no structure to the rope.
A double braid is designed so the centre takes the load while the main function of the outer is to protect the inner.
For this reason we make the inners with a considerably longer pitch than the outer, This is particularly important when making non-stretch ropes out of Dyneema, (UHMWPE), Vectran or some of the other aramid fibres which are used to obtain ropes with low stretch. However to be able to effectively splice these ropes there must be sufficient "crossover" in the yarns to lock the centers together when one is fed down the centre of the other (see splicing techniques).
We have carried out many strength tests at Nautilus and have found the optimum pitch for each diameter of rope, both outer and centre. The accompanying graph shows the effect of pitch on stretch for a range of 10mm UHMWPE centers.
While the longest pitch gives the least stretch the splicing and termination of these would be ineffective, so we have chosen the longest pitch with the best ability to lock into each other giving maximum strength and durability.



The graph is of actual results from the tensile tester and shows inconsistencies when some yarns have broken prematurely which can be attributable to termination of the ends or splicing. However there are two clear trends:

1 The shorter the pitch the more stretch the centre has.

2 The shorter the pitch the lower overall strength.

The slope of the tension line is the most important and gives the stretch after the initial consolidation and evening out of the strain in the various yarns that comprise the center.