Flying Dutchman Class Rule 38 interpretation

FD Class Rule 38 Jib hoist height

The introduction of 2:1 halyard systems at the head of the Genoas of some Flying Dutchmen has led to some discussion of the iterpretation of Class rule 38, the 2010 version of which states:

38. When the **boat** is fully rigged with **sails** hoisted in racing trim and sheeted for windward sailing, no part of the jib must project forward of or above an imaginary line, drawn from a point on the deck line 5450 mm from the aft side of the transom to a point on the **mast** below the lower edge of **Limit mark** (band) number 4, with a tolerance forward of 5 mm. **(See diagram).**

Together with a diagram, a 2012 version of which is shown in figure 1.

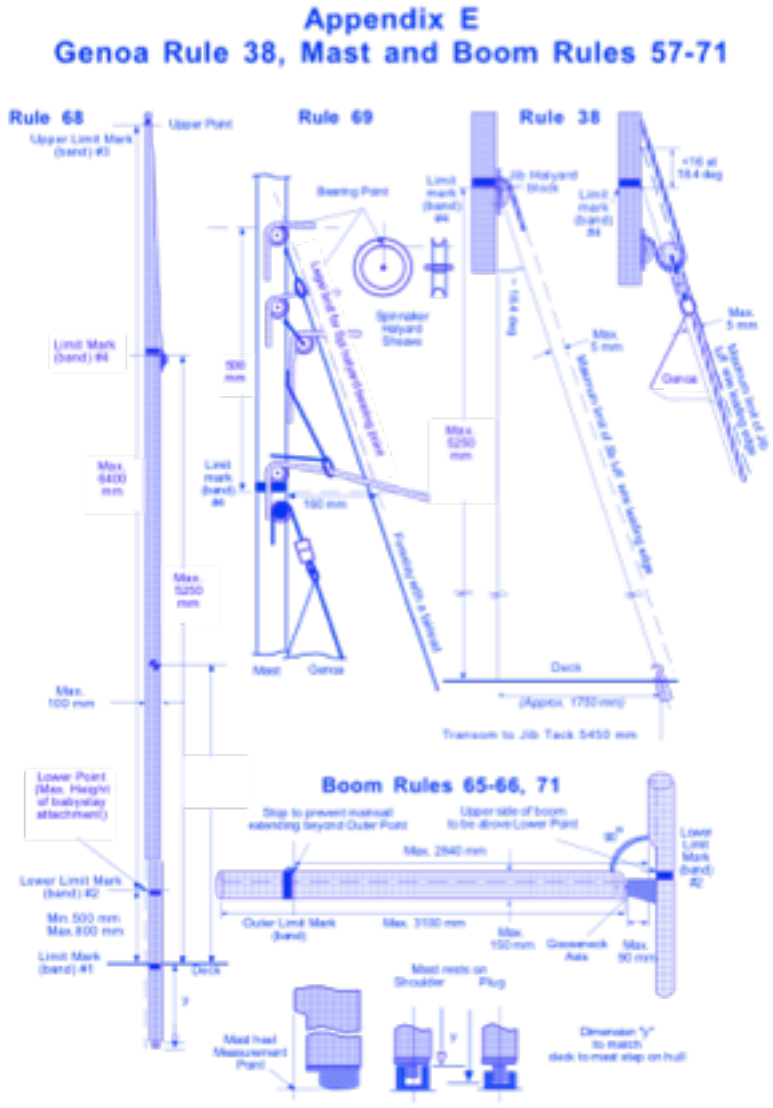

Figure 1 *Proposed 2012 class rules Appendix E, see Rule 38 added detail top right.*

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The Flying Dutchman class is unique in that for historical reasons the Genoa is not measured. It is controlled by specifying the positions of the Genoa furler centreline at the deck, the height of the intersection of the Genoa luff with the front of the mast and the position of the Genoa sheet fairlead. Any sail which fits into this triangle is class legal. This unique class rule is often misunderstood by sailors from other classes and its implementation with a 2:1 halyard system possibly needs some explanation. In fact during the technical committee discussions we found some aspects of the rule to be unclear and so have introduced changes in the wording of the rule, which however do not change the rule as implemented since at least 1974 and probably before, see figure 2.

In principle class rule 38 would require the FD to be rigged and the Genoa sheeted in, then the boat laid down on its side to check the intersection of the extension of the Genoa luff with the front of the mast, for every Genoa to be used with that mast. This, of course, is not the way the rule is enforced. The class has, at least since 1974 and probably before, assumed that the Genoa halyard is the same or larger diameter than the Genoa luff wire and so if the extension of the front edge of the Genoa halyard intersects the front of the mast below the limit mark i.e. band 4, the the mast is legal. This is illustrated in figure 2. Of course the intersection point depends on the angle the halyard makes with the mast and this has always been taken as 18.4 degrees, the angle the halyard makes with the mast when the mast is vertical. This is checked during regatta inspection with a jig such as that shown in figure 3.

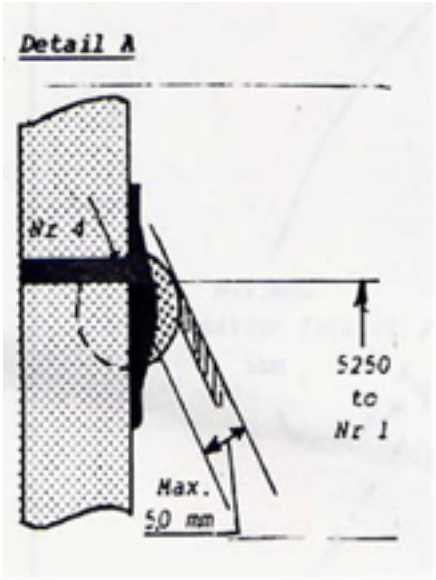

Figure 2 *A 1970s illustration of Class Rule 38*

Originally the rule required the luff to be behind the imaginary line specified in the rule. At one point a large number of masts were manufactured with protruding Genoa halyard blocks and to accommodate them the 5 mm tolerance was introduced. This tolerance also took care of the extension of the Genoa luff in front of the centreline of the furler and so served a double purpose.

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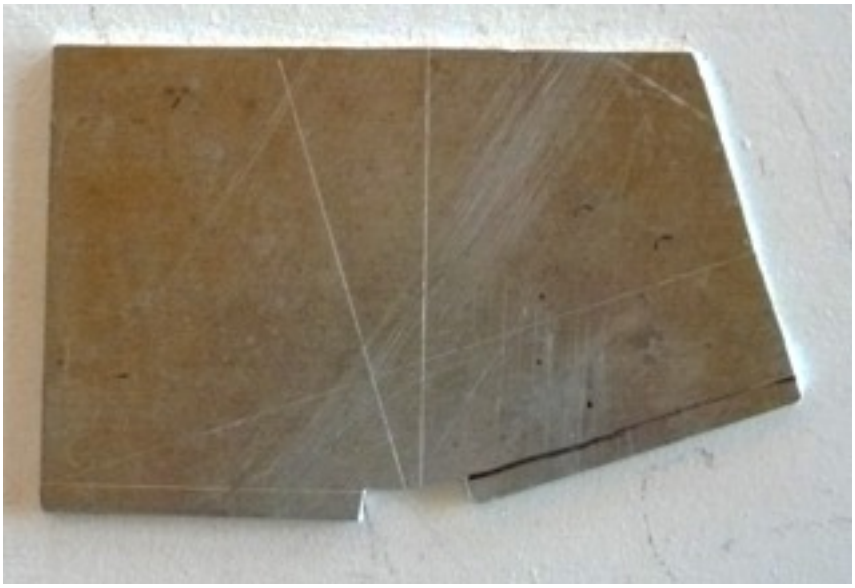

Figure 3 *Jig for determining Genoa luff intersection with front face of the mast. The Genoa halyard is held parallel to the edge (i.e. at 18.4^0 along the red arrow) and no part of the Genoa sail shall be in front of the line on the jig which is at 5 mm from the edge.*

Modified Rule 38 wording and new Rule 87

During the technical committee discussions of rule 38 some Genoa head points were looked at and it was observed that they extended significantly forward of the luff wire, as illustrated in figure 4. If the halyard leading edge is on the “imaginary line” this Genoa head would technically be illegal. The problem is the diameter of the Genoa head cringle and the lashing to the luff wire thimble. Clearly we do not want this to affect the mast band 4 measurement, so it is proposed to make the wording of rule 38 correspond to the measurement practice by specifying the leading edge of the luff wire rather than the Genoa luff. Although it is unlikely that any sailmaker would build Genoas which then extend significantly infront of their luff wires, just to close this loophole a new rule 87 is introduced to restrict the extension of the Genoa luff to be within 10 mm of the front edge of the luff wire when tensioned.

The modified wording, which does not change the rule but brings it into line with the established FD class measurement practice is:

38. When the **boat** is fully rigged with mast vertical, **sails** hoisted in racing trim and sheeted for windward sailing, no part of the jib luff wire, excluding cringles, shall project more than 5 mm forward as measured perpendicular to the luff, of an imaginary line drawn from a point on the deck line a maximum 5450 mm from the aft side of the transom to a point on the front of the **mast** at a maximum 5250 mm above the deck line, that is below the lower edge of **Limit mark** (band) number 4. (See Appendices D and E)

87. No part of the jib/Genoa shall extend more than 10 mm in front of the forward edge of the luff wire when the luff is tensioned.

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A purest would point out that as the mast is raked the angles change and so an FD rig measured vertically might not be legal under the 2010 class rule. This effect is very small even for extreem angles of rake used in practice. However, the mast also bends and this does significantly change the intersection point of the extension of the Genoa luff wire with the mast. This would clearly be impossibly difficult to control, so the rule has been revised to specify that the measurement is made with the mast vertical.

Figure 4 *The head of a North FD Genoa showing that this sail head point extends 8 mm in front of the leading edge of the luff wire.*

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2:1 Genoa halyard systems

Some Flying Dutchman sailors have recently been rigging their jib halyards with a 2:1 mechanical advantage at the head of the Genoa by dead ending the halyard at the front of the mast, passing it round a block shackled to the swivel at the head of the Genoa, and then around the Genoa halyard block at the front of the mast, as shown in figure 3. This has the advantage of reducing the compression load in the mast and so is an advance that the class should allow.

There are in fact two alternative arrangements, i.e. with the halyard dead ended above or below the block. Figures 3 and 4 show a mast with the halyard system modified with a 2:1 system dead ended above the halyard block and what it would be like with the dead end below the block. If you are rigging a brand new mast then you can choose either arrangement, and position the Genoa halyard block accordingly. With the dead end above the block, figure 3, the block has to be significantly below band 4, while the block can even be above band 4 if the dead end is below it. The yellow band in figure 4 shows where the block could be, relative to band 4, and still be class legal.

However, when modifying an existing single halyard system, which was just class legal, dead ending the halyard above the halyard block moves the Genoa luff forward by the radius of the floating block and makes the rig illegal, as can be seen in figure 3. The obvious minimalist solution is to dead end the halyard below the block but this has the major disadvantage that it lowers the swivel and so increases the minimum mast rake. If the gooseneck is not at the maximum height permitted (band 2 Maximum 800 mm above band 1) then band 4 could be raised by raising the mast step, which would overcome this problem but require readjustment of the rig.

Presently modified masts all seem to be dead ended above the block so that with current Genoa luff lengths the mast can still be brought vertical. However, for this system to be class legal band 4 would have to be where the yellow band is shown in figure 3 so the halyard block has to be lowered. For an existing mast it would be unsound to try and move the block, but a possible solution is to lower the block by cutting off the appropriate length at the heel of the mast. This of course lowers the mainsail and changes all the shrouds, lowers and babystay settings and so should not be undertaken lightly. Furthermore this then lowers the swivel so again limiting the rake of the mast. A solution to this would be to shorten the luff wires in the Genoas but that also has obvious disadvantages.

Installations on a new mast, which has not yet been cut to length, are illustrated in figure 7. The illustration shows the halyard block protruding significantly in front of the mast thus requiring it to be below band 4 for a single part halyard. However it can be seen that for the halyard dead ended below the block it can be above band 4 and the Genoa head is essentially at the same height as for the single halyard. In contrast if the block is below the dead end then it has to be well below band 4 and the head of the Genoa is lower. This conclusion does depend on how far the halyard block extends in front of the mast. For a completely recessed halyard block the geometry is the same independent of whether the dead end is above or below the block. It is therefore wise to make a detailed drawing with the proposed block and fittings before deciding on your choice. It is also important to engineer the dead end to be strong enough. The shock loads when falling off a wave and digging in the bow can be very large!

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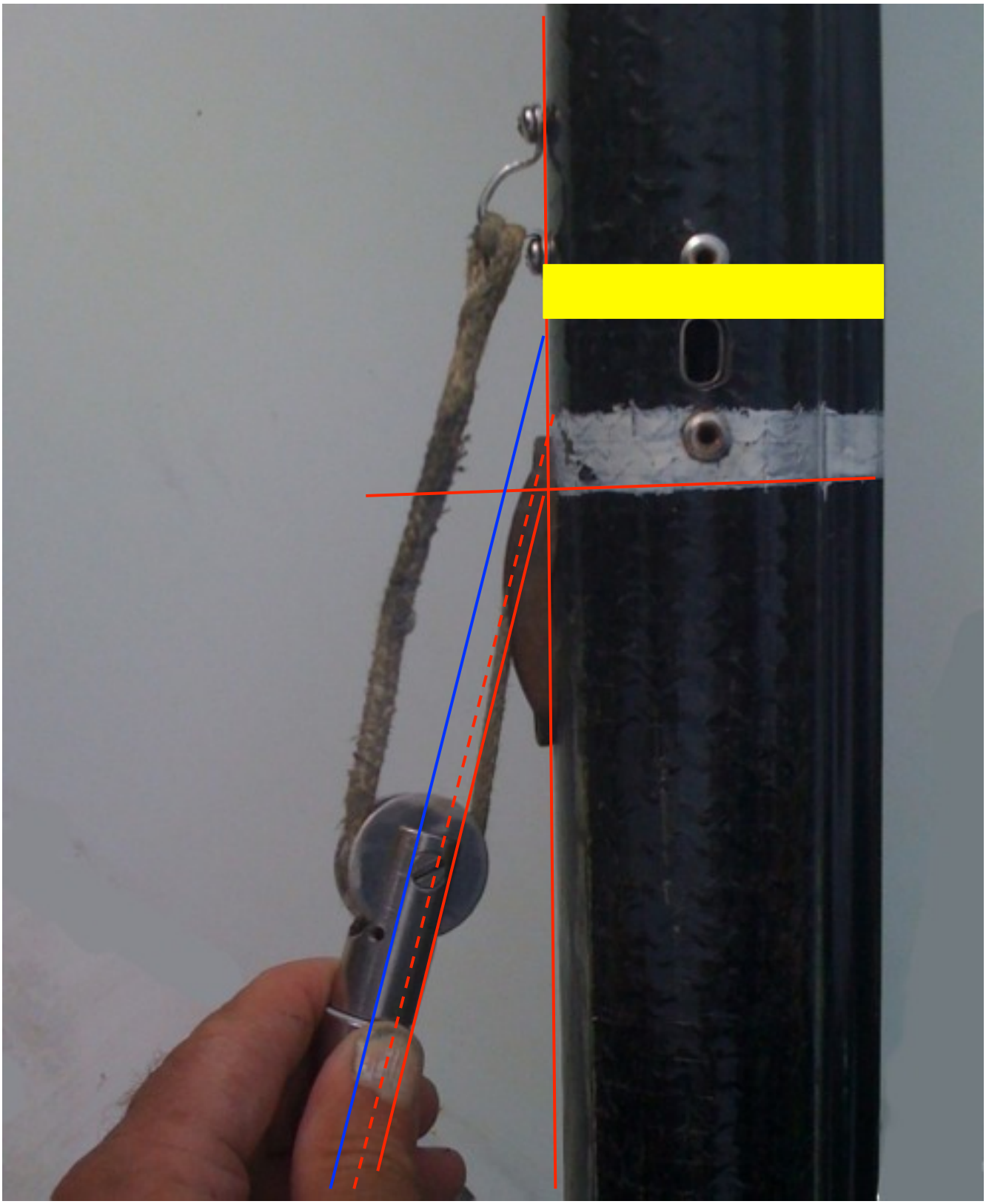

Figure 5 *A 2:1 Genoa halyard system dead ended above the halyard block. The dashed red line shows the 5 mm tolerance and the blue extension of the leading edge of the jib luff wire shows that this rig does not conform to FD class rule 38 by about 6 mm.*

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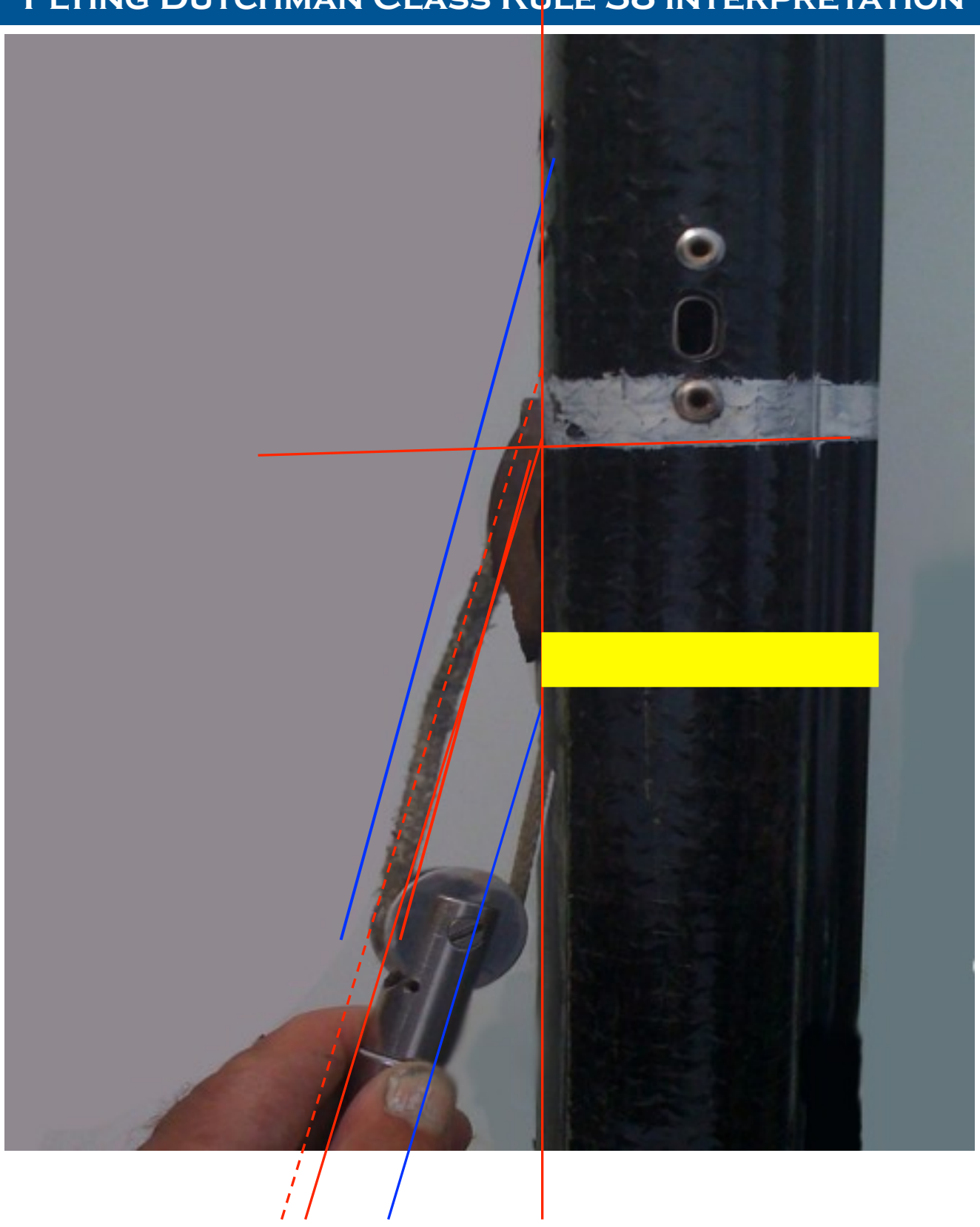

Figure 6 *The same 2:1 Genoa halyard system dead ended below the halyard block. The dashed red line shows the 5 mm tolerance and the blue extension of the leading edge of the jib luff wire shows that this rig easily conforms to FD class rule 38.*

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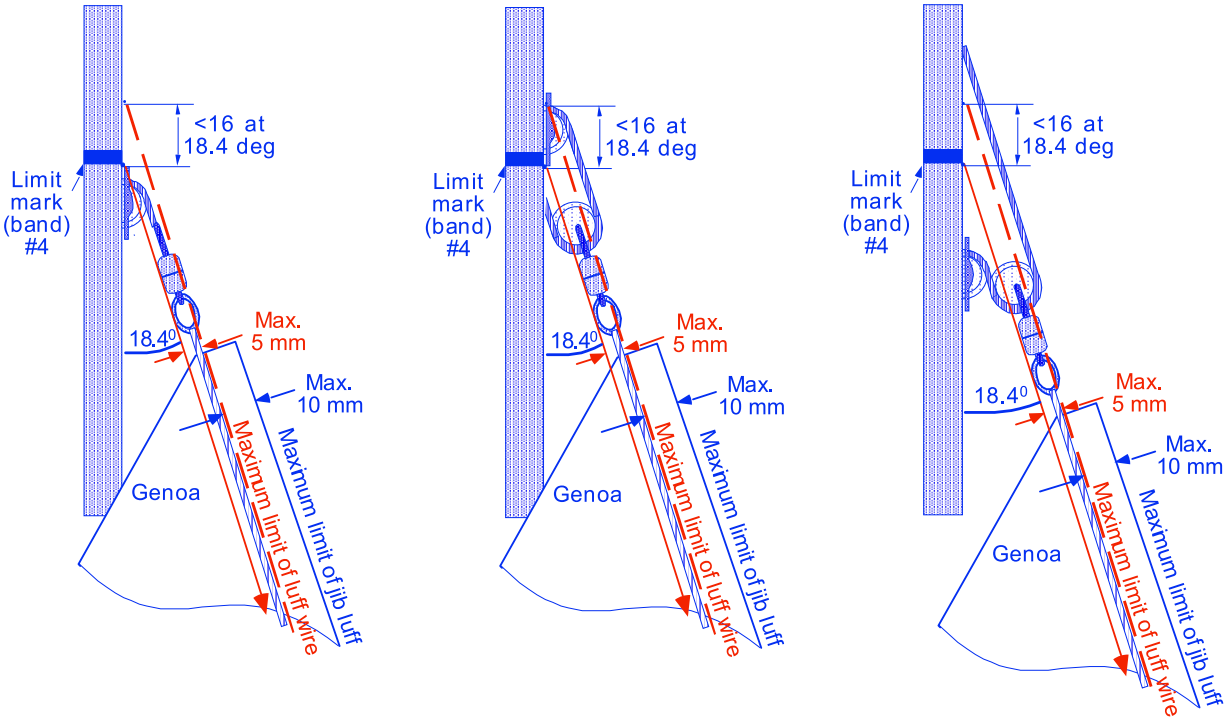

Figure 7 *A single part Genoa halyard, a 2:1 Genoa halyard system dead ended below the halyard block, and a 2:1 Genoa halyard system dead ended above the halyard block.*

Some keelboat classes are now using floating halyard locks on Genoas and this is a possible next step, as it reduces mast compression even more. An internal lock below the halyard block, similar to those used on small boat main halyards, would bring the system back to a geometry the same as the current 1:1 systems. This of course would require a Genoa furler which could be adjusted up and down, as was used in the 1960s, so all solutions have there design challenges.

In conclusion although installing a 2:1 Genoa halyard system will significantly reduce the mast compression and thus allow lighter construction, this modification has to be carefully engineered for the mast to be class legal. If all you want to do is to add a dead end and a floating block, then you have to dead end the halyard below the block and either live with the fact that you cannot rake the mast forward as much as before, raise the mast step or shorten your Genoa luff wires. Dead ending the halyard above the block makes the rig illegal unless you lower the halyard block, or recess it by the radius of the floating block! For a new mast the heel can be cut so that the Genoa halyard block is at the appropriate height and if a protruding block is used the geometry suggests that dead ending below the block allows for more forward mast rake than the alternative.

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31 January 2012