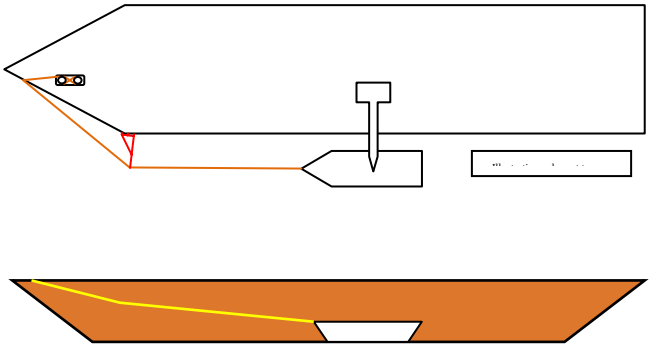
Marine Safety Forum – Lesson Learned 11-01

Issued: 27th January 2011
Subject: Daughter Craft Bow line Boom Failure

During a routine Daughter Craft (DC) recovery operation the boom that was positioned to lead the bow painter forwards failed, causing the recovery to be aborted. The vessel had created a lee for recovery and the DC made a normal approach and hooked on to the bow line. As the DC was being positioned under the davit she surged forward on a swell and, as the DC coxswain was correcting his position the swell dropped away astern causing the DC to surge astern. As the weight was taken up on the bow line the boom jumped to a vertical position and bent to an angle of approximately 30 °.
This boom is designed to guide the bowline between the DC and the vessels forr'd fairlead, and to hold it away from the side of the vessel to enable the DC to sit under the davit for recovery. In normal use this boom is not load bearing, but acts as a compression strut. The load is taken mainly on the bow line with minimal load transfer to the boom in compression and its associated rigging. The angle of pull is downward - from the DC in the water, through a block fitted to the end of the boom to the forr'd fairlead on the vessel. This would have the effect of ensuring that the boom does not rise in normal use. See illustrations below.



The investigation established that on this vessel the bow line from the DC had been routed directly inboard through the back spring fairlead which is just forr'd of, and above the boom. This effects the operation in several ways.

- The loads and stresses involved are generally increased as most of the load of the DC and any additional loads imposed by sea surges are transferred directly to the end of the boom. However this would not normally be an issue whilst the boom remains in the deployed position as this load is taken up by the forr'd chain stay.

- Because the DC bow line is lead inboard via the fairlead the inboard end is higher than the boom and any weight on the bow line is transferred via the block fitted to the end of the boom into an upward force on the boom end. As this load increases, we believe in this case by the surging effects of the swell on the DC, the force can be sufficient to lift the end of the boom enough for it to snatch back to the vertical position. As the boom lifts the forr'd chain stay becomes slack as it is secured at a higher position than the boom end thus allowing the entire load to be transferred to the boom itself.

- As the boom is not designed for the loading applied in these circumstances it failed, bending just past the point where the strut was fixed.

It was also established that there was no clear procedure for correct rigging of this type of boom and considered that the boom should not be capable of topping under any circumstances in normal use. The design of such booms should therefore include a locking strut or some other system to ensure it remains in the deployed position regardless of circumstances.