Lifeboat release gear

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Following recent discussions in *Seaways* on lifeboat safety solutions, the following design for a positively loaded releasable lifeboat hook and system is proposed.

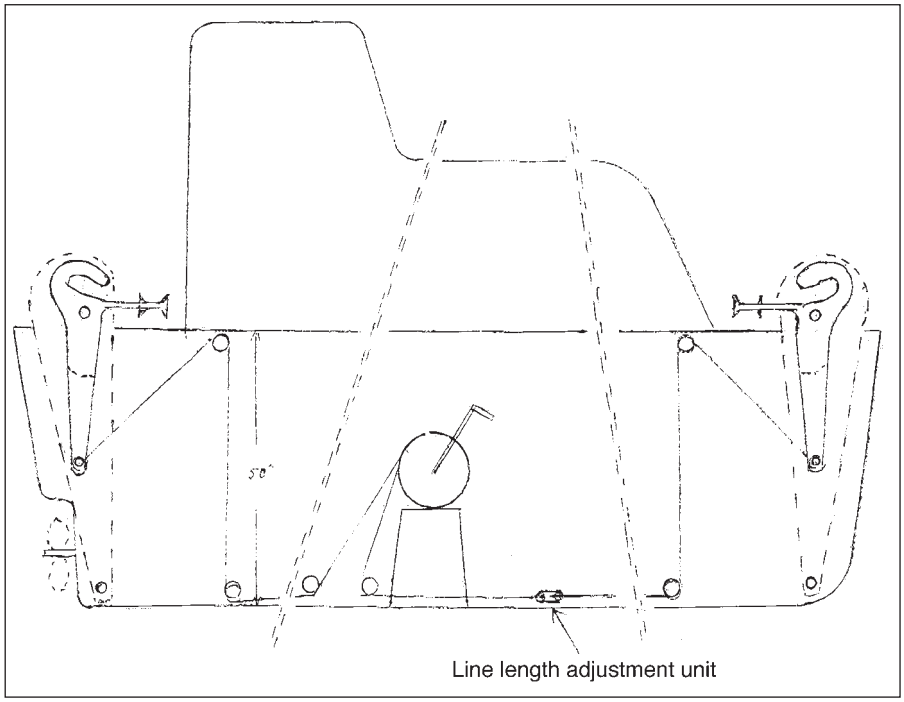
This proposed system is very similar to the type of lifeboat hook that has been used for many years, but with a few modifications. Figure 1 shows the general arrangement of the system in an enclosed lifeboat and Figures 2 and 3 show details of the lifeboat hook.

The system operation is simple and intuitive. When the hook is closed, the lift handle on the hook is parallel to, and just clear of the deck. In this condition, the boat weight acts through the pivot of the hook without any tendency to open it. Impact loadings cannot trip the hook in any way. It can only be opened through a force deliberately applied via the onboard, manually operated winch.

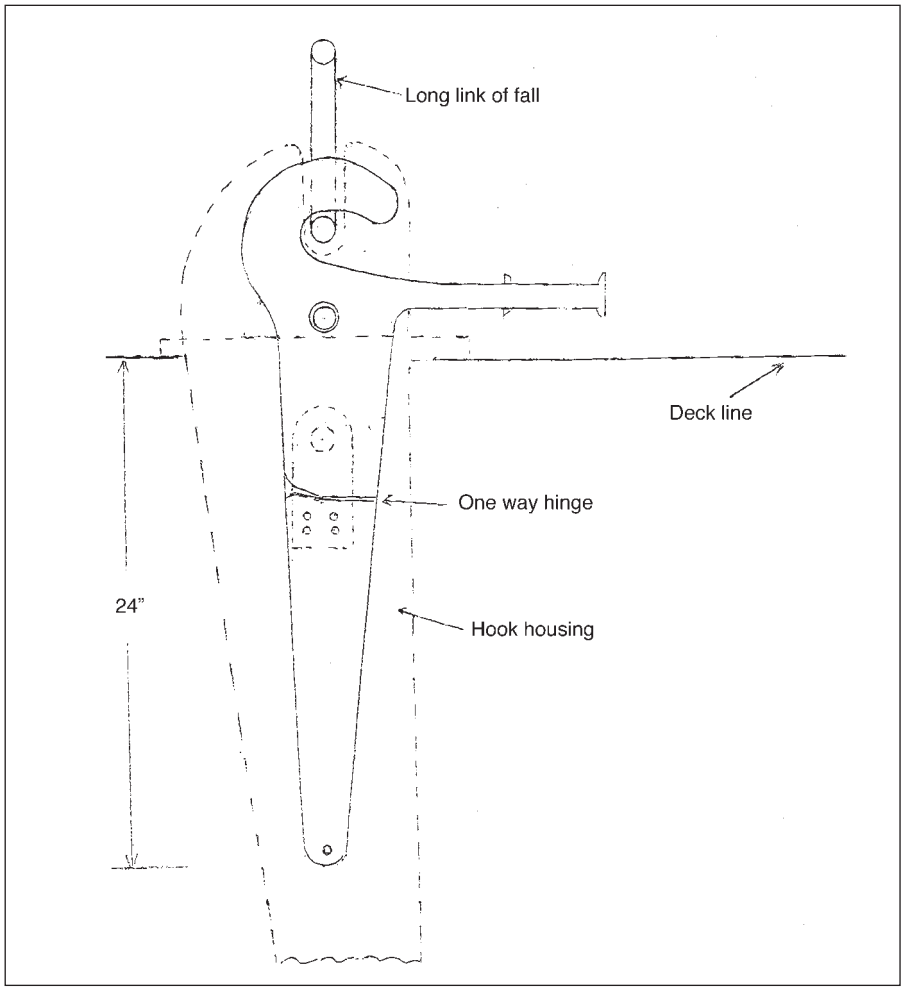
To release the hooks, the onboard manual winch is used. Both the forward and aft hooks release simultaneously. They remain open until the winch is backed to its start position. The effort required to open the hooks depends on the existing load on the falls, the designed curvature of the hook and the friction in the system.

To provide a quick function system within reasonable effort requirements, the design example described here would require a maximum of eight turns of the winch handle to fully open the hooks, and maximum effort of about 45 lbs. Maximum effort would be required if the boat was still clear of the water, or the boat was being severely dragged by the ship and in both cases interference type hooks were being used.

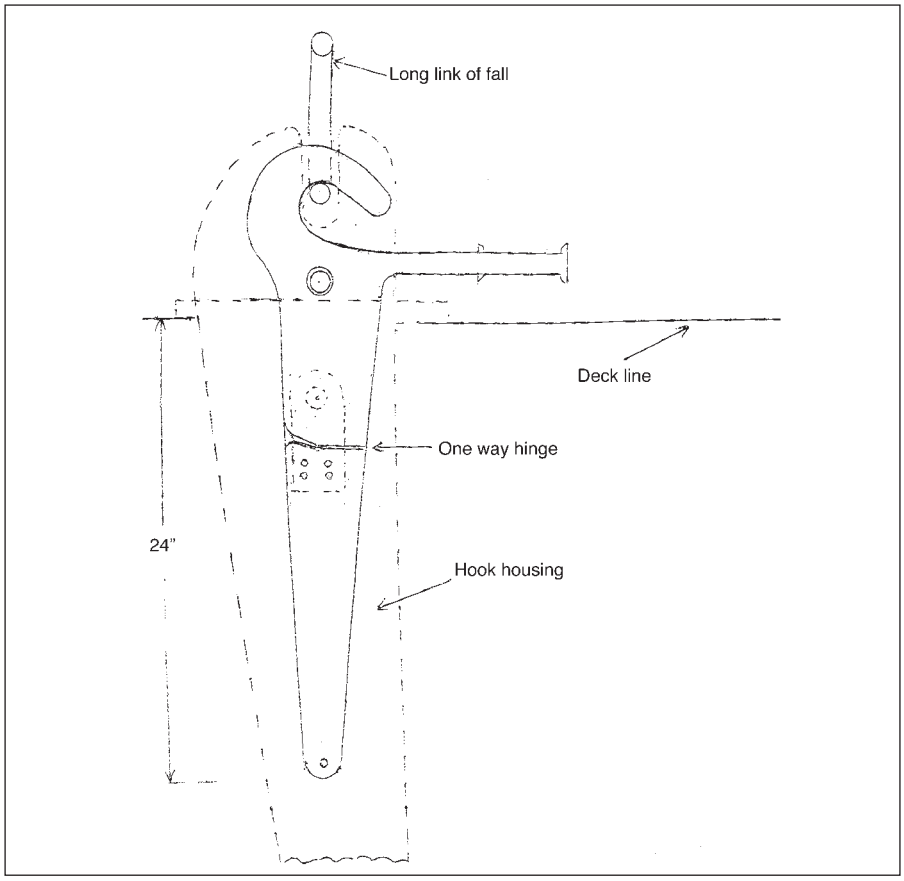
With the falls slack, the winch handle can be turned with next to no effort. The effort required to release the hooks with full load on the falls, that is with the boat suspended by the falls clear of the water,



▲ Figure 1: General arrangement for lifeboat hook system



▲ Figure 2: Neutral curvature hook



▲ Figure 3: Interference curvature hook

depends on the curvature design of the hooks and the friction in the system.

The hook could be made with either neutral or interference curvature.

■ Neutral curvature means that the distance between the hook pivot and the face of the hook which is in contact with the long link of the fall system, remains constant during rotation of the hook from a closed to an open position.

■ Interference curvature means that the distance between the hook pivot and the contact face of the hook diminishes during rotation of the hook from the closed to the open position.

With the boat suspended by the falls but using a neutral curvature hook, the winch effort has only to overcome the friction between the long links and the contact face of the hooks, at both ends simultaneously, together with any friction in the onboard system itself. This would arise from friction in the hook pivots, the guide pulleys and the winch: however, with reasonable maintenance this would only be minor.

With interference curvature, the boat has to be raised relative to the falls to permit the hook to rotate from a closed to an open condition.

Interference hook

The reason for considering the use of an interference hook is to provide sufficient distinction by way of the required effort at the winch, to enable the operator to determine easily whether the boat is waterborne or not. The winch has ample capacity to release the boat hooks under any circumstance. In this design example the required effort at the winch is more than doubled for the interference hook. The pull required to open the hooks diminishes as the hook opens as the pull direction of the operating wire becomes more perpendicular to the leg of the hook.

The operating area of the hook and the pulley and wire system should be lightly panelled in so that they cannot be obstructed by anything in the boat.

Re-engagement of the falls to the boat hooks is done manually and independently at each end. The winch is backed off to its original start position so that the operating wires do not impede the closing of the hooks. With the winch backed off, the hooks will now be in a closed condition, which will be evident as the lift handle for the hook will be sitting close to and parallel to the deck.

The lifeboat hooks have hinged legs which minimise actual slack wire occurring in the system. This is done to assist in avoiding any possibility of fouling when the hooks are manually operated. A small amount of slack wire will still occur when a closed hook is opened manually.

The boat hook is ballasted with about 10ft/lbs in the closed condition, so a 10lb effort is required on the opening handle to open the hook. The effort required increases slightly as the hook is opened. When re-attaching the falls for the purpose of lifting the boat, the lift handle is used at each lifeboat hook to open the hook and insert the long link.

After engaging the long link in the hook, the boat hook is closed and can only be opened by the winch if there is any load on the falls. The hook is in a positively closed condition which can be easily confirmed by visual inspection. The hook lifting handle will be horizontal and close to the deck.

The housing of the hook is closed except for the top and the slot for the lift handle. It is constructed so that after the long link has been engaged on the lifeboat hook, the link cannot disengage or misalign itself on the hook, should the fall become completely slack.

To prevent water entry into the boat via the hook housing, sufficient tallow should be applied to cover the hook pivot pin and to close the working clearances through which water could enter the boat. The housing will drain through the lift handle slot.

■ The particulars used in this example design are:

1. loaded weight of lifeboat 5 tons;
2. hook lever advantage 5:1;
3. friction of 15 per cent between the long link and the hook face.
4. a wedge coefficient of 5:1 on the interference hook. Total lift 0.5";
5. winch: SWL 1t; velocity ratio 29:1; drum 6" diam.; spur 12"; pinion 2"; handle 14";
6. maximum winch load 1200lbs; wire load 600lbs; wire diameter 0.25".

If a system similar to the above were to be used, it would of course be a matter of considerable review and rigorous prototype testing by the appropriate authority.

If an approved design were developed it could be manufactured by approved firms. In this regard, approved materials and proof testing would be required.

Beaufort 6

Quite apart from the above, I would suggest that all lifeboats be brought up to a standard whereby they can be shown to be safely launchable in sea state Beaufort 6.

To facilitate this, it is suggested that the tricing and bowsing systems be made one system with controlled release from a single station within the boat. A shock absorbing system would be incorporated in the fall system and slamming protection provided on the inboard side of the boat.

I believe reasonably effective provisions to accommodate launching in Beaufort 6 could be made without major modification.