

Fail to Safe Lifeboat Hooks

Introduction The goal of this document is to provide a definition for **“Fail to Safe”** as it relates to lifeboat hooks.

“Safe” Defined To be able to define Fail to Safe it is first necessary to define what is meant by “safe” in the context of Lifeboat hook release systems.

There are a number of ways in which to define “safe” for a lifeboat hook release system. To focus on what is relevant we should focus on the accidents that have been killing people over the past twenty years. These deaths have resulted from the inadvertent release of lifeboats at a considerable height above the sea.

Given this context “Safe” is defined as lifeboat hooks that will not inadvertently drop the lifeboat from a height above the sea as they remain closed when a failure in the system occurs.

Elements of a Lifeboat Release System Defined To be able to define the criteria for Fail to Safe it is also necessary to define the elements of a lifeboat hook release system.

A lifeboat release mechanism is comprised of two key elements.

The Primary Elements - *The hooks with the associated pivoting pins and side plates.*

The primary elements are the elements that take the weight of the boat; they include actual hooks themselves, the pins around which each hook pivots and the side plates into which the pins are attached. It is these elements that actually support the lifeboat when it is suspended in the air. These elements are tested with a six to one overload test, well above what is required to support a fully loaded lifeboat. There is no recorded incident where the metal of the hook, hook pin or side plates has failed and dropped a lifeboat.

The Secondary Elements - *All other parts of the release mechanism including the release handle, associated cables, cams, safety pins, hydrostatic interlocks etc.*

All parts of a lifeboat release mechanism system other than the primary elements above can be seen as secondary elements. Secondary elements do not bear the weight of the lifeboat but perform ancillary functions such as allowing for simultaneous release and locking the hook.

Fail to Safe Criteria Defined For a lifeboat hook release system to achieve the “Fail to Safe” standard it should meet the following test criteria.

- (1) Failure of any part of the Secondary Elements above should not affect the Primary Elements remaining in a safe condition (i.e. not inadvertently releasing the lifeboat while suspended).
 - (2) The design should be such that the entire removal of all Secondary Elements should lead to the Primary Elements remaining in a safe condition. The Primary Elements will remain in a safe and stable condition without reliance on any of the Secondary Elements.
 - (3) The Secondary Elements should only be required for ancillary functions such as allowing simultaneous release and for re-setting the hooks and should not be required for achieving hook stability.
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Importance of Achieving Fail to Safe A review of lifeboat accidents clearly demonstrates that the lack of a Fail to Safe capability in release mechanism design has led to the vast majority of lifeboat accidents and deaths.

It is imperative that new regulations and new lifeboat release mechanism designs focus on achieving a **“Fail to Safe” design**. A “Fail to Safe” design will save lives.
