

Inherently Stable Versus Inherently Unstable Lifeboat Hooks

Introduction

The goal of this document is to provide a definition for **Stable** and **Unstable** lifeboat hooks. To achieve this it is necessary to look at whether the lifeboat release mechanism system achieves Primary Stability or Secondary Stability.

Primary Stability

For release mechanisms that achieve **Primary Stability**, the hooks, in isolation from the rest of the release mechanism system, remain closed when under load. When the design achieves Primary Stability, then the hook itself (without the rest of the release mechanism system) is **Inherently Stable**. The hooks do not require the rest of the release mechanism system to achieve stability. The rest of the release mechanism system is used for achieving simultaneous release and resetting of the hooks and is not needed for stability.

Secondary Stability

For release mechanisms that are only able to achieve **Secondary Stability**, the hooks, in isolation from the rest of the release mechanism system, will open when under load, and require additional devices within the release mechanism system to achieve stability. When the design achieves only secondary stability then the hook itself (without the rest of the release mechanism system) is **Inherently Unstable**. The rest of the release mechanism system is used for achieving simultaneous release, resetting of the hooks and is also needed for stability.

Comparison Table

The table below shows the differences between lifeboat release mechanisms that achieve Primary Stability through Inherently Stable hooks, and lifeboat release mechanisms that achieve only Secondary Stability with Inherently Unstable hooks.

Key Functional Characteristics		Primary Stability	Secondary Stability
1	Stability of the hooks	Inherently Stable	Inherently Unstable
2	Method used to ensure stability	Gravity	Cam, Cable, Hydrostat, Pin
3	Weight of the lifeboat holds the hooks closed when suspended above the water	Yes	No
4	Weight of the boat is not used to open the hooks for on-load release	Yes	No
5	Weight of the boat has to be overcome for on-load release and not merely "engaged" to activate a release	Yes	No
6	Weight of the boat applies no rotational (opening) forces to the hook	Yes	No

Note: The six characteristics of Primary Stability with Inherently Stable hooks reduce the chance of dropping a lifeboat. The six characteristics of Secondary Stability with Inherently Unstable hooks increase the chance of dropping a lifeboat.

Importance of Achieving Primary Stability

Reliance on Secondary Stability adds complexity to the release mechanism to achieve stability and greatly increases the chance of human error in maintenance and operation. A review of lifeboat accidents clearly demonstrates that reliance on secondary stability 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 requiring **Inherently Stable Hooks**. Inherently Stable hooks will save lives.