

MacTaggart Scott

Helicopter Handling Safety Index Meter



Limits for handling helicopters on warships are currently defined by a simple roll and pitch limitation or by speed-polar plots of Sea State. The former is a practical approach, quantifiable by the responsible flight deck officer, but is so simplistic that it precludes many safe combinations of speed and heading. The latter is more rigorous, but is not easily interpreted by ship's staff.



It can be shown that the forces on the helicopter reduce to functions of ship body accelerations, ship rotations, and relative wind speed and direction. Of these, ship body acceleration is the dominant driver. A mathematical model of the helicopter critical failure parameters are installed in the algorithm. As the parameters influencing helicopter motion are easily measured from ship mounted sensors, helicopter loads may be computed in real time. From these computations, a single variable termed the Safety Index is derived, giving the ship a clear and unambiguous measure of safety.



Safety Index Meter mounted at FDO position in hangar.



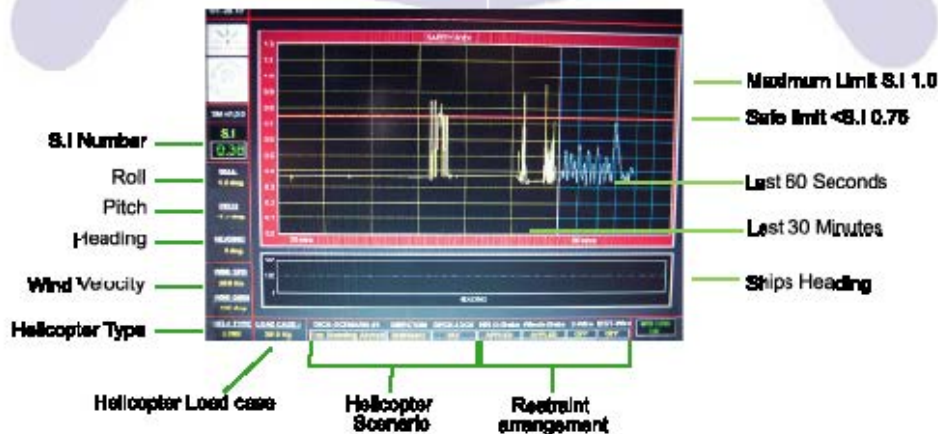
Motion reference unit mounted under the flight deck.

The Safety Index maximises availability and hence capability. It is entirely independent of ship type, heading, speed or Sea State.

Helicopter deck handling limits are traditionally defined by roll, pitch and wind velocity. The safety index meter additionally measures accelerations from roll, pitch, yaw and heave, wind velocity and ship's heading. Then, via a non-linear mathematical model of the helicopter, simplifies the presentation of this complex information to both the equipment operators and the ship's command. The result is one number called the Safety Index, where 1.0 indicates maximum limit and anything below 0.75 is safe. The safety index meter continuously displays the status of the helicopter in real time, utilising a display which can be readily understood by the **Fight Deck Officer**. It can also show the previous 30 minutes time history.

The Safety Index Meter only requires four simple operator inputs:

1. Selection of Helicopter Type
2. Selection of restraint mode
3. Input of Helicopter Mass
4. Helicopter Location



The Safety Index exceeds the requirements of CAP437, the Civil Aviation Authority (CAA) requirements for reporting conditions for offshore helicopter landings.

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SAFETY INDEX METER



HELI TYPE



RESTRAINT



MASS



LOCATION

