Chapter 17
Handling, controllability and performance

17.1 General

The operational safety of the craft in normal service conditions and in equipment failure situations of a craft to which this Code applies should be demonstrated by full-scale tests of the prototype craft. The objective of tests is to determine information to be included in the craft operating manual in relation to:

.1 handling and performance limitations;

.2 actions to be taken in the event of prescribed failure; and

.3 limitations to be observed for safe operation subsequent to prescribed failures.

Heavy Weather Sea Trials (see Annex 8) should be used to establish the limit of the safe operational envelop of the craft in normal service conditions and in equipment failure situations.

17.2 Proof of compliance

The information on controllability and manoeuvrability which should be contained in the Operating Manual should include the characteristics under 17.5, and the list of parameters of the worst intended conditions affecting the controllability and manoeuvrability according to 17.6 and the performance data verified in accordance with annex 8.

17.3 Weight and centre of gravity

Compliance with each of the handling, controllability and performance requirements should be established for all combinations of weight and centre of gravity position significant for the operational safety in the range of weights up to the maximum permissible weight.

17.4 Effect of failures

The effect of any likely failure in handling and control devices, services or components (e.g. power operation, power assistance, trimming and stability augmentation) should be assessed in order that a safe level of craft operation can be maintained. Effects of failure identified as being critical according to annex 4 should be verified in accordance with annex 8

17.5 Controllability and manoeuvrability

17.5.1 Instructions to crew members should be provided in the Craft Operating Manual regarding required actions and craft limitations subsequent to prescribed failures.

17.5.2 It is necessary to ensure that the effort required to operate the controls in the worst intended conditions is not such that the person at the control will be unduly fatigued or distracted by the effort necessary to maintain the safe operation of the craft.

17.5.3 The craft should be controllable and be capable of performing those manoeuvres essential to its safe operation up to the critical design conditions.

17.5.4.1 When determining the safety of a craft in respect of handling, controllability and performance, the Administration should pay particular attention to the following aspects during normal operation and during and subsequent to failures:

.1 yawing
.2 turning
.3 stopping in normal and emergency conditions
.4 stability in the non-displacement mode about three axes and in heave
.5 trim
.6 plough in
.7 lift power limitations.

17.5.4.2 The terms in 17.5.4.1.2, .6 and .7 above are defined as follows:

.1 "Turning" is the rate of change of direction of a craft at its nominal maximum operating speed in specified wind and sea conditions.
.2 "Plough in" is an involuntary motion involving sustained increase in drag of an air-cushion vehicle at speed, usually associated with partial collapse of the cushion system.
.3 "Lift power limitations" are those limitations imposed upon the machinery and components which provide the lift.

17.6 Change of operating surface and mode

There should be no unsafe change in the stability, controllability or attitude of the craft during transition from one type of operating surface or mode to another. Information on change in the behaviour characteristics of the craft during transition should be available to the master.

17.7 Surface irregularities

Factors which limit the ability of the craft to operate over sloping ground and steps or discontinuities should be determined, as applicable, and made available to the master.

17.8 Acceleration and deceleration

The Administration should be satisfied that the worst likely acceleration and deceleration of the craft, due to any likely failure, emergency stopping procedures, or other likely causes, would not hazard the person on the craft.

Refer to Annex 3, table 1 and Chapter 4, Para 4.3.1

17.9 Speeds

Safe maximum speeds should be determined, taking account of modes of operation, wind force and direction and the effects of possible failures of any one lift or propulsion system over calm water, rough water and over other surfaces as appropriate to the craft.

17.10 Minimum depth of water

The minimum depth of water and other appropriate information required for operations in all modes should be determined.

17.11 Hard structure clearance

For amphibious craft, when cushion borne, clearance of the lowest point of the hard structure above a hard flat surface should be determined.

17.12 Night operation

The schedule of tests should include sufficient operation to evaluate the adequacy of internal and external lighting and visibility, under conditions of normal and emergency electrical power supply during service, cruising and dock manoeuvres.