Introduction
The main concern with the Ro-ro passenger ship design relates to safety. It is vital that a rational approach to safety is demonstrated, validated and adopted. The safety levels requested by the passenger transportation demand an investigation on the actual damage stability standards and on possible rules developments.

The standards of SOLAS 90, for vessels operating in seas with significant wave height less than 1.5m, are equivalent to the HSC code. To take in account the effects of significant wave heights over than 1.5m the adoption of the SA has been proposed for the HSC vessels.

The Conceptual and Preliminary Studies of Typical Subdivisions
Three example ships have been developed complying the main standard practices for the Ro-ro pax mono- and multi-hulls according to the HSC code 2000/2009 damage stability criteria.

SA applications and results to HSC vessels

• In this case, the ship does not require variation of external geometry to pass SA additional stability criteria but only internal solution that does not invalidate the effectiveness of the hull.

• The large multi-hulls present high volume of the Ro-ro deck with a wide water-plane area, that means raising in volume of additional water on Ro-ro deck, with heightened free surface moments;

• The M3 mono-hull presents the Ro-ro space arranged on different decks, connected by non-watertight ramps, that have been modeled as internal flooding points.

References
RINA (1994) Rules for the Classification of HSC Craft, Effective from 1 January 1996
RINA (2009) Rules for the Classification of HSC Craft, Effective from 1 January 2009
Ministero delle infrastrutture e dei trasporti, DM 750 (2005) Individuazione dei tratti di mare in cui le navi Ro-ro da passeggeri effettuano servizi di linea e corrispondenti valori d'altezza significativa d'onda.