



EASA
European Aviation Safety Agency

Ditching and Emergency Flotation CS27 & 29 Amdt. 5

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Timeline

- Rulemaking Group formed end 2012
- WG - Helicopter manufacturers (3), Offshore Helicopter Operators (2), Specialist Naval Engineering Consultant, PPE/Evacuation/Survival Consultant, CAA-UK, FAA, C-NLOPB, Oil and Gas UK
- NPA Issued for Public Comment on 23rd March, 2016
- Amdt 5 to both CS27 and CS29 published 14 June 2018



New Requirements – Why?

- In otherwise survivable water impacts, most fatalities occurred as a result of drowning.
- Old requirements assumed capsizes would not occur.
- Testing for helicopter ditching has little resemblance to actual sea conditions.



New Ditching Requirements

Subject	CS27	CS27 Cat A	CS29
Improved structural requirements, and EFS "crashworthy".	X	X	X
Model testing in irregular waves and sea conditions substantiated quoted in RFM	X	X	X
EFS Auto deployment	X	X	X
EFS Auto arm		X	X
Flight crew exits function well underwater (incl. black/yellow markings, HEELS, all seat positions, incl. stroked)	X	X	X
Passenger exits 1 per 4 pax and function well underwater (incl. black/yellow markings, HEELS, handholds)	X ₍₁₎	X	X
Emergency equipment suitable for sea conditions (effectively, raft must be designed for Hostile sea conditions)	X	X	X
Life rafts remotely deployable (cockpit/cabin/from water, in different floating attitudes, line length appropriate)	X	X	X
Introduced ELT installation guidance	X	X	X
Direct step into life rafts and emergency lighting to illuminate step in point		X	X
Not sink with critical flotation unit lost		X	X
Non-jettisonable door not inhibit underwater escape		X	X
Doors to stay open in sea conditions	X	X	X

(1) Under water markings illumination not required to be full "HEELS"



New Emergency Flotation Requirements

- New requirement created for Emergency Flotation.
- Previously, Emergency Flotation requirements were in MG10.

Subject	CS27	CS27 Cat A	CS29
Improved structural requirements (but floats/attachments only for CS27, incl. Cat A).	X	X	X
Model testing in irregular waves and sea conditions substantiated quoted in RFM	X	X	X
Life rafts remotely deployable (cockpit/cabin/from water, in different floating attitudes, line length appropriate)	X	X	X
Not sink with critical flotation unit lost		X	X



Wave Tank Testing

Capsize resistance to
be substantiated in
irregular waves.



Flight Crew Exits

- “HEELS”
- Black/yellow markings
- Operable with all seat positions
- Including “stroked”





Passenger Exits

Black/yellow marking
for operating handle

“HEELS”



One exit pair per
4 pax

OK





Remote Liferaft Release

Remote raft deployment
(cockpit, cabin, from water).





Emergency Location Transmitter (ELT)

Introduced AMC guidance
for ELT installation
aspects.





Not sink after loss of one float

Must not sink with
critical flotation unit
lost.



“Easy step in” for life raft boarding

Must be able to “step directly into life raft”.



Egress post capsized, with any door open.

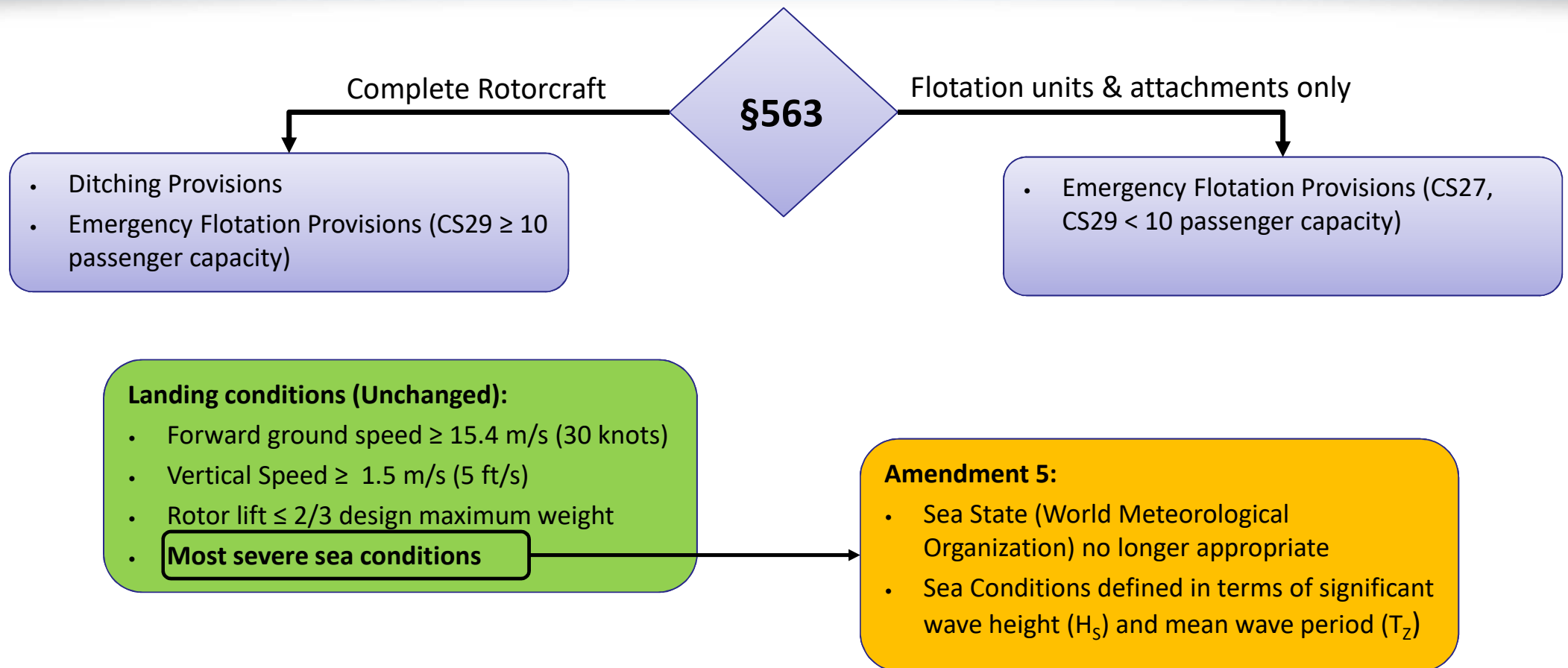


Must be able to still
escape underwater
with any door open





§563 Structural ditching and emergency flotation provisions





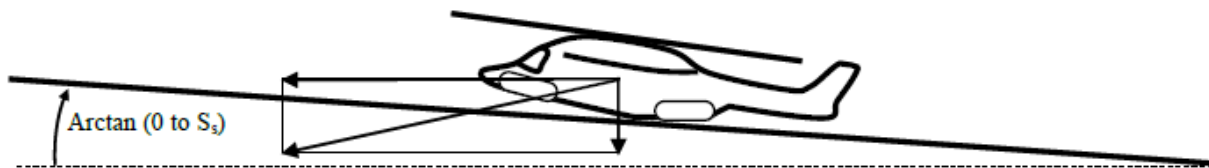
§563 Structural ditching and emergency flotation provisions

► AMC §563:

- Water entry condition may be simulated considering the rotorcraft contacting a plane of stationary water

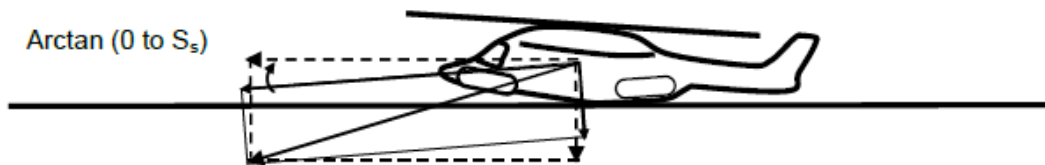


Water entry into wave



Water entry into inclined plane of stationary water,
steepness range - zero to significant steepness (S_s)

$$S_s = 2\pi H_s / (g T_z^2)$$



c) Water entry into a stationary horizontal water surface
using an equivalent water entry angle and velocity relative to the water surface
(Dashed arrows show required horizontal and vertical speeds)



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Floats fixed or intended to be deployed before water contact

Airloads

- 1.11 VNE float deployment speed
- 1.11 VNE with fixed floats

Loads During Water Entry

Landing Condition with floats deployed

Seakeeping Loads (Floats/Attachments only)

- Fully immersed float
- Less immersed (if full shown unlikely)

Water Entry: unintended stowed floats (ditching provisions approval)

- If damage occurs (to floats, attachments, surrounding structure) it should not prevent proper deployment and functioning of floats

Floats intended to be deployed after water contact

Loads During Water Entry

Landing Condition with floats stowed

Loads during inflation (Floats/Attachments only)

- Fully immersed float
- Less immersed (if full shown unlikely)
- Drag from 10.3m/s (20 kts) through water

Note: Seakeeping loads covered by the above.



§563 Structural ditching and emergency flotation provisions

- Additional Structural Considerations (Generic CRI):
 - Limit and ultimate load conditions: floats and float attachment structure
 - Some structural damage and leakage is permitted, provided that it does not:
 - cause immediate injury to the occupants
 - jeopardize the flotation, stability and the safe evacuation
 - Failure or detachment of secondary structure (e.g. fairings, covers):
 - threat to the flotation equipment and the life rafts must be minimized



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Thank you for your attention!

Any questions....?

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