# Helicopter Ditching, Water Impact & Survivability Workshop


Cologne, 5-6 December 2011

# Helicopter design from a survival training aspect


## Authors

- **Pekka Eskelinen, Lamor Subsea & Akela (Finland)**

  Advisor, Lamor. Entrepreneur with interest in training, education and saving lives. Founder of Akela.

- **Michael Blomqvist, Meriturva & MJ Airship Safety Training Oy (Finland)**

  Technical Director, Meriturva Maritime Safety Training Centre, Survival Training Unit. Inventor of survival equipment and safety training tools.

- **Mats Mellberg, SSTC & KSC AB (Sweden)**

  Chief Safety Trainer, SSTC. Consultant, owner KSC AB

# Ideas on how to improve survival rates in helicopter accidents

- Design aspects inside the helicopter
  - Listing of key issues
  - Some ideas for improvement
- Design aspects outside the helicopter
  - Examples of known problems
- Considerations on what occupants should know and have available on their person

# Design aspects inside the helicopter

- **Helicopter exit mechanisms**
  - too many variables in design
  - standards needed for exit/escape openings
  - one study mentions 23 different designs of 35 maritime helicopters
  - maintenance of emergency exits doors/windows release mechanisms (compare with life rafts, life jackets)

# Design aspects inside the helicopter

- Seats
  - Dimensions too small with rescue suits/gear
  - Seats come loose during an accident and occupants are strapped in seat belts
  - Strengthening of seat fittings
- Storage
  - loose objects inside cabin
- Standard harnesses
  - 4-point with emergency release

# Design aspects inside the helicopter

- Evacuation from inside the Cabin
  - position and availability of life rafts
  - automatic activation of life rafts
  - lighting HEEL obligatory emergency lights
  - shorten available escape routes
  - cabin dimensions to allow easy movement
  - increase number of exits

# Design aspects inside the helicopter

- Illumination
  - Use of updated LED technology to provide improved visibility
- Connection between cockpit and cabin
  - No partition in between

# Design aspects inside the helicopter

- **Heliraft**
  - Difficulties to get raft out of the cabin for deployment
  - Deployment of liferaft (which is located outside) from inside the cabin
  - Launch by catapult or location near the exit/s
  - Improve the supplies on the raft, e.g. Flashlights are usually inadequate, include emergency water
  - Strengthen materials, e.g. at point of entry

# Design aspects outside the helicopter

- Heliraft
  - Timing of activation
  - After capsizing
  - Easily accessed and utilized when wearing gloves
  - Sea anchor deployment, automatic or instructions
- Floats
  - Automatic activation
  - Timing of activation
  - Before capsizing

# Design aspects outside the helicopter

- Sea Anchor
  - All helicopters to be equipped with sea-anchor, launch automatically / manually
  - To position front of the helicopter against the waves and wind (Obligatory in Norway)
- Structural design
  - to avoid damage to life raft during deployment and floation following a survivable water impact
  - eliminate the formation of sharp edges which could shear or puncture life rafts

# Design aspects outside the helicopter

- Jettisoning doors
  - There should be no risk of puncturing the floats
  - Even when launched incorrectly
  - If the door falls on the float, risk of puncture and subsequent capsizing of the helicopter
- Outside Door handles
  - Location such that can be opened by a person in water
  - Improve possibilities of pilots to save passengers

# helicopter underwater escape training

# Design aspects for occupants

- Supplies to be worn on person
  - Survival suits, with automatic aeration?
  - Divers goggles to be supplied to each occupant and to be kept on person
  - Extra air; air pocket, EBS, etc
  - Life vests; size and suitability, not only weight but neck size

# Design aspects for occupants

- **Pre-flight training**
  - To know & experience what happens when wearing a survival suit and upside down under water
  - Who is responsible for the life raft
  - Use of life rafts in water, e.g. distance to helicopter before and after activation
  - Use of pyrotechnical equipment

# Design aspects for occupants

- More Pre-flight training
  - Reference point
  - Holding breath, Remaining calm, Open eyes to see
  - Learn how to deal with disorientation
  - Under Water Escape training should be updated with more water awareness training
  - To day in OPITO/BOSIET and OLF courses there is not much time in for this issue
  - The advantage is that trainees learn better skills

# helicopter underwater escape training

# Training aspects for helicopter underwater escape

- **Simulator**
  - To experience the loss of orientation eg. disorientation
  - Simulate under controlled and safe environment
  - Combine vertical and horizontal rotation in training to enhance learning the necessary survival skills when inside a ditched, rotating and sinking, helicopter

# helicopter underwater escape training - in the dark

- Video removed due to large size 20 MB

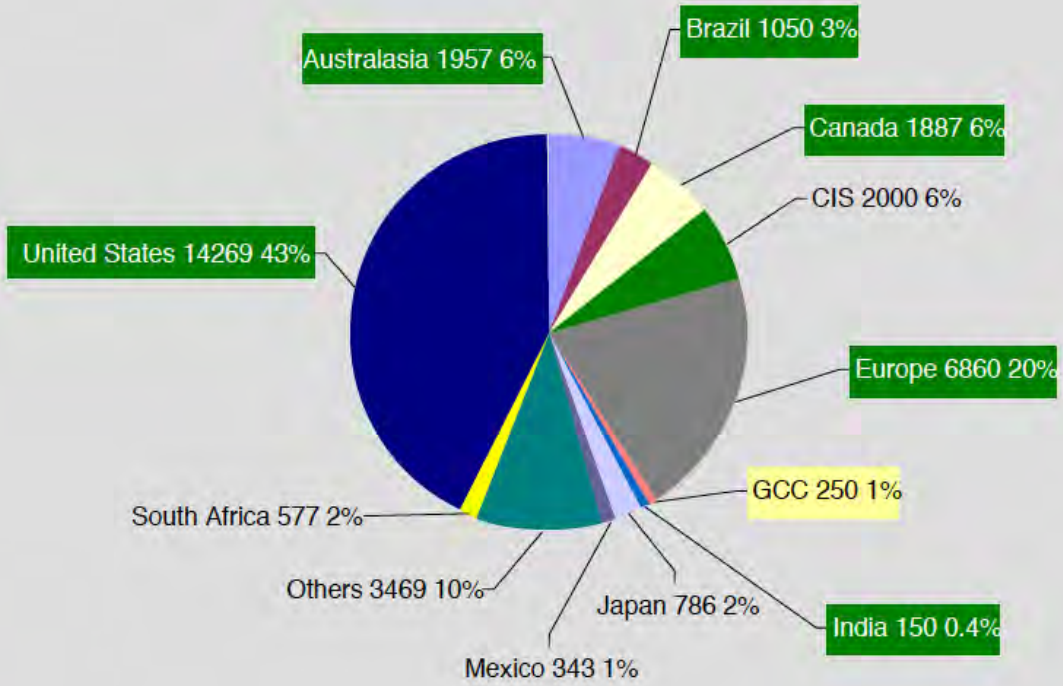
# Thank You

- Reference information
  - List of publications
  - User experience
  - Training Experience
- Developing co-operation
  - Willing to learn and share

# Accident
# Worldwide Helicopter Fleet Distribution

**33598 aircraft**

44 fatal and non-fatal accidents



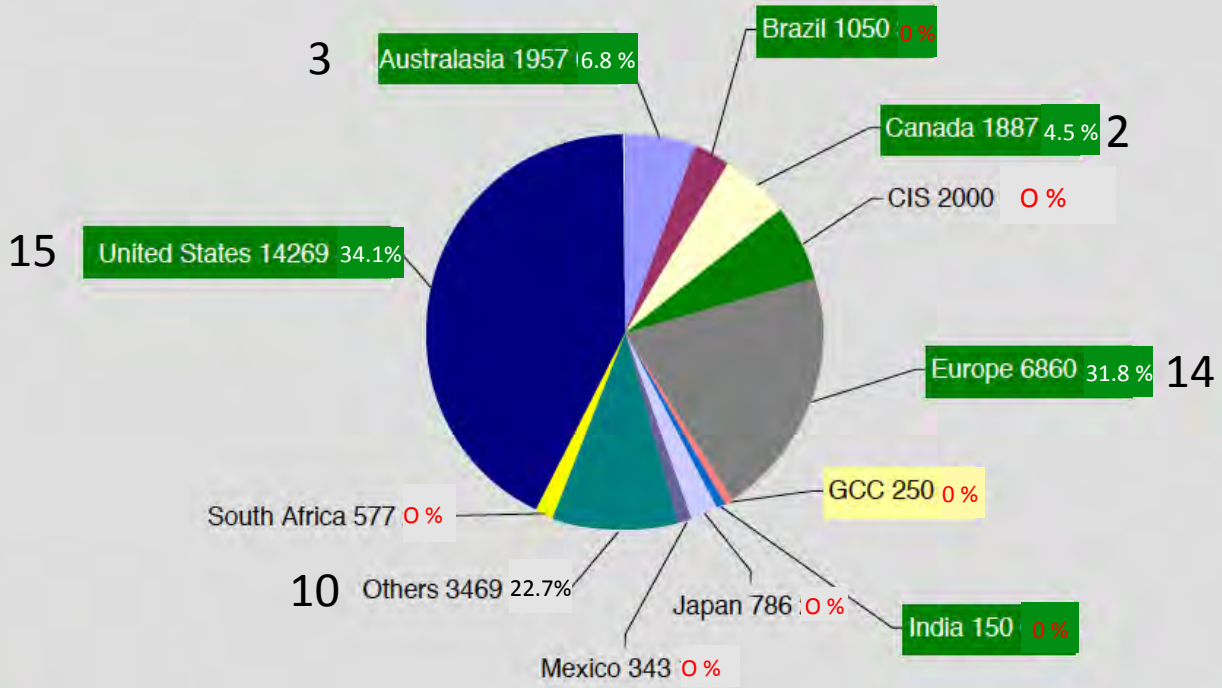

year 2009 accidents

helis.com

# Accident
# Worldwide Helicopter Fleet Distribution

**33598 aircraft**

44 fatal and non-fatal accidents




year 2009 accidents

helis.com