

A world map in white outlines on a blue background with a grid of latitude and longitude lines. The map is centered on the Atlantic Ocean. Several instances of the AKELA logo are placed across the map, including one over North America, one over Europe, one over Africa, one over South America, and one over Australia. The main title is overlaid in large orange text.

# Helicopter Ditching, Water Impact & Survivability Workshop

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# Helicopter design from a survival training aspect

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# 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)

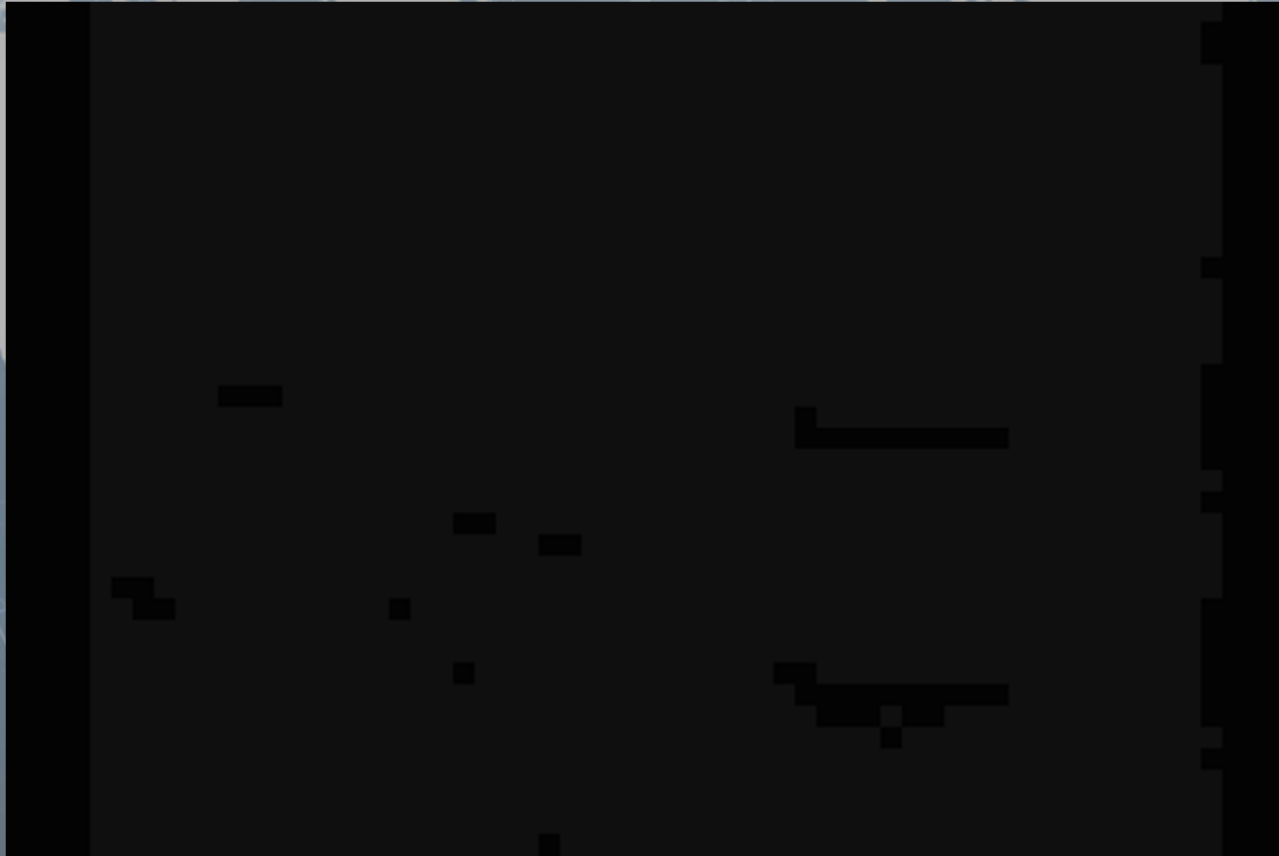
- **Structural design**

- to avoid damage to life raft during deployment and flotation 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

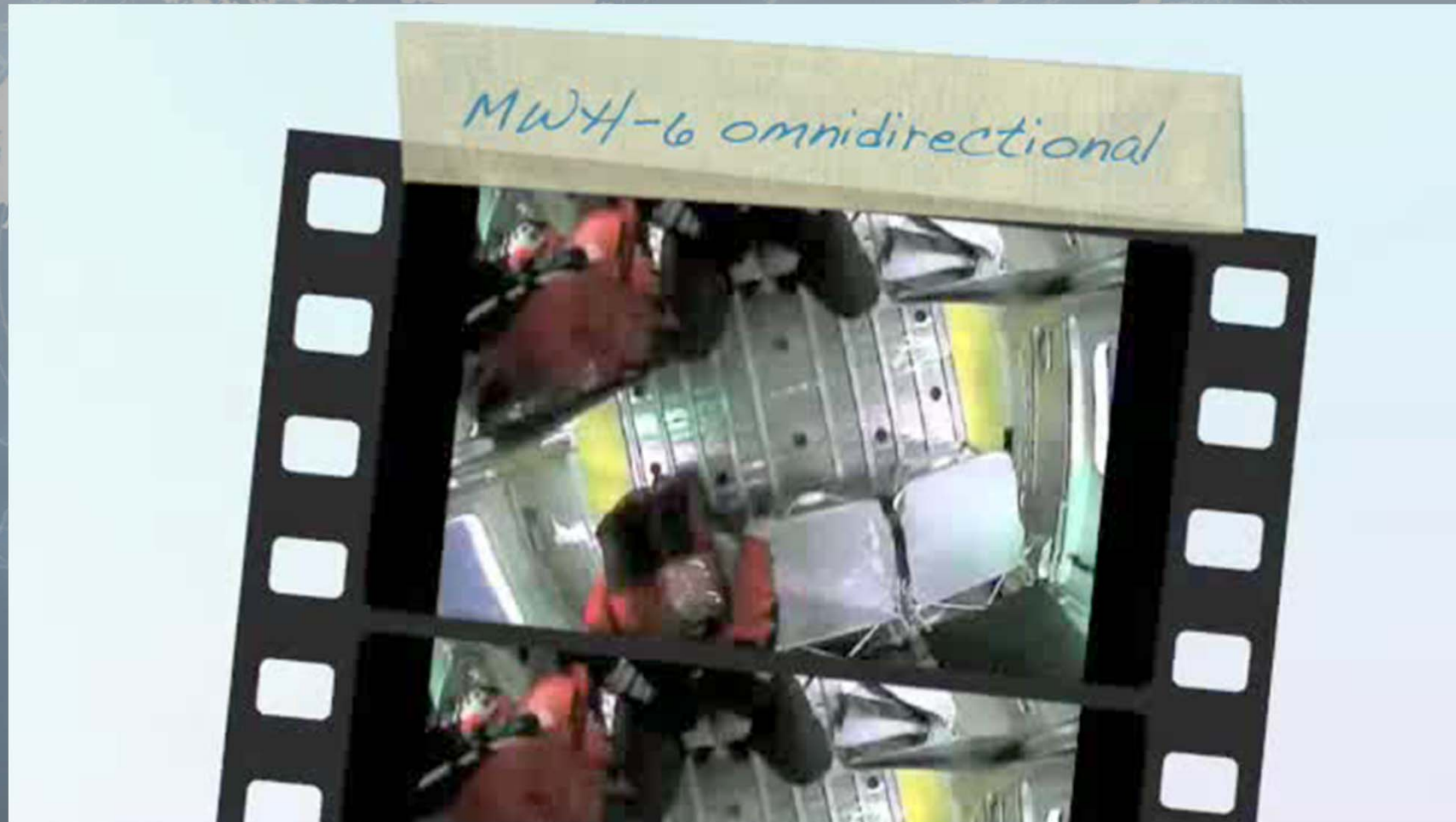
- **Pre-flight training**

- 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

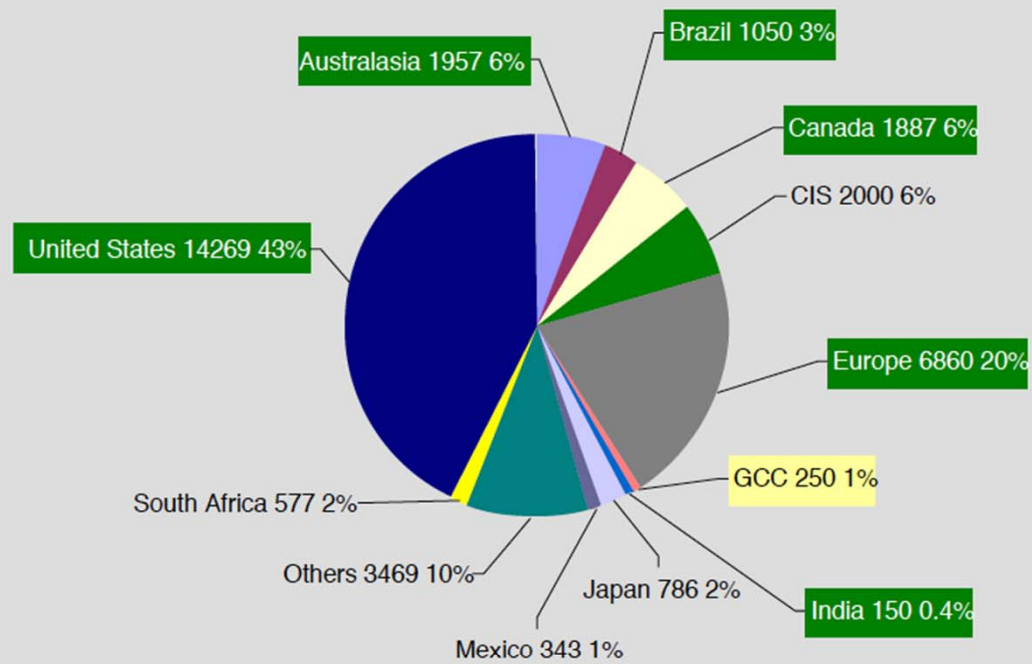
# Thank You

- **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



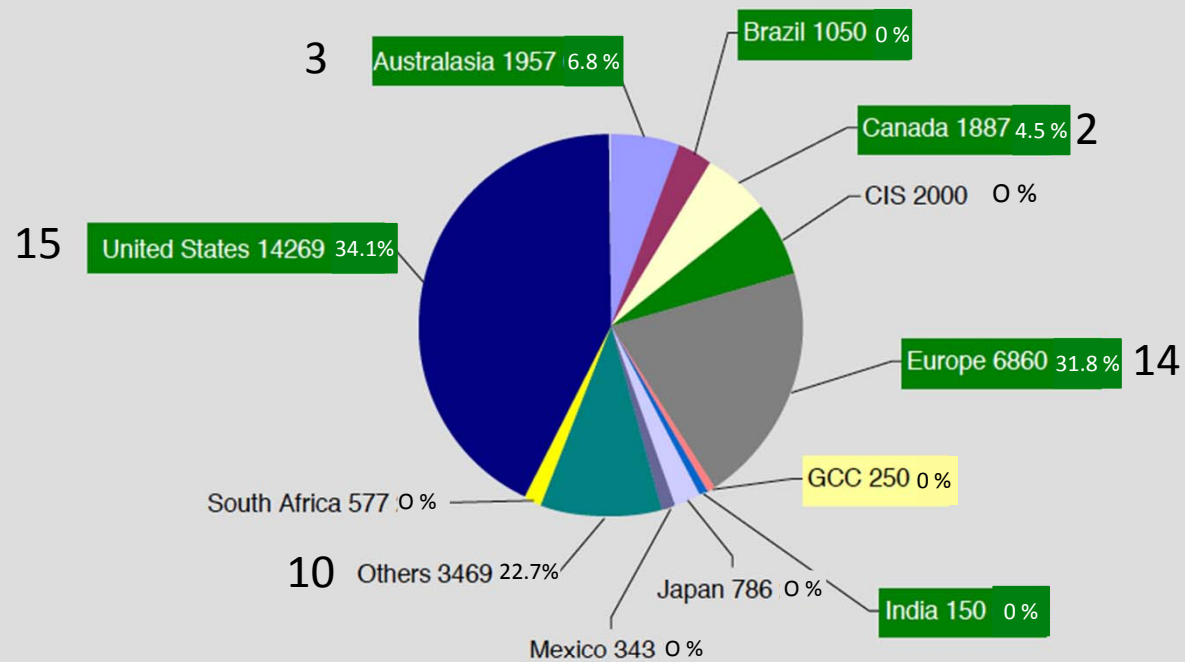
year 2009  
accidents

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