



SAFE LANDING ZONES

PRESENTED BY: RIAAN NOTHNAGEL

# WHAT WE ARE GOING TO LOOK AT.

- WHY ALL OF THIS?
- LANDING ZONES.
- PATIENT PACKAGING.
- AIRCRAFT APPROACH.
- AIRCRAFT DEPARTURE.
- DEBRIEF.





search ID: rhan492

**WHY ALL OF  
THIS....?**



- RESEARCH...
- RAISE AWARENESS.
- MITIGATE POTENTIAL RISKS.
- TO PREVENT ACCIDENTS/ INCIDENTS.
- KEEP EVERYONE SAFE.
- ALL OF US WOULD LIKE TO GO HOME AT THE END OF OUR SHIFT.

# RESEARCH

- NUMBERS...
- ELEVEN RELEVANT STUDIES WERE IDENTIFIED. FIVE STUDIES (THREE FROM GERMANY, ONE FROM THE US, ONE FROM AUSTRALIA) ANALYSING HEMS ACCIDENTS ON THE BASIS OF 10,000 MISSIONS WERE IDENTIFIED.
- CRASH RATES PER 10,000 MISSIONS RANGED BETWEEN 0.4 AND 3.05 AND FATAL CRASH RATES BETWEEN 0.04 AND 2.12.
- IN ADDITION, NINE STUDIES (SIX FROM THE US, TWO FROM GERMANY, ONE FROM AUSTRALIA) USED 100,000 FLYING HOURS AS A DENOMINATOR.
- HERE, CRASH RATES RANGED BETWEEN 1.7 AND 13.4 AND FATAL CRASH RATES BETWEEN 0.91 AND 4.7.



# 2024/2025 HEMS ACCIDENTS AROUND THE WORLD, 6 ACCIDENTS, 20 FATALITIES

## 2024

- JANUARY, BELL 206L - BIRD STRIKE, FATALITIES, US.
- SEPTEMBER, HAL DHUV – CRASH, FATALITIES, INDIA.
- OCTOBER, BELL 206L - GUY WIRE STRIKE, FATALITIES, US.
- OCTOBER, MIL Mi2 - EMERGENCY LANDING FATALITIES, RUSIA.
- DECEMBER, EC 135 - BUILDING STRIKE, FATALITIES, TÜRKİYE.

## 2025

- MARCH, EC135- LOSS OF CONTROL?, FATALITIES, MISSISSIPPI. (ONLY PRELIM REPORT AVAILABLE)



# HEMS ACCIDENTS IN SOUTH AFRICA TO DATE

## ACCIDENTS IN THE PAST 38 YEARS:

- 1986 JANUARY, WIRE STRIKE, NO FATALITIES, TPA, VAAL AREA.
- 2004 SEPTEMBER, PROFICIENCY CHECK, NO FATALITIES, STAR, DURBAN, VIRGINIA.
- 2004 DECEMBER, MAIN TRANSMISSION FAILURE, NO FATALITIES, AV8, WOODY CAPE EASTERN CAPE.
- 2005 OCTOBER, CRASHED INTO THE SIDE OF A MOUNTAIN DUE TO WEATHER, 4 FATALITIES, AMS RED CROSS, HAARLEM WESTERN CAPE.
- 2021 JANUARY FATAL, PITCH CONTROL LEVER SEVERED, 5 FATALITIES, NETCARE 911, COLENZO AREA.

## INCIDENTS

- 2019 DECEMBER, STRUCK PERIMETER FENCE, 0 FATALITIES, NETCARE 911, SUNNINGHILL HOSPITAL.
- 2025 JANUARY, TAIL ROTOR INCIDENT, CREW VS TAIL ROTOR, 0 FATALITIES, ROCKET HEMS
- OTHER?



# LANDING ZONES

- LZ OFFICER.
- LZ MARKER.
- LZ PREPARATION.
- LZ SIZE.
- LZ HAZARDS AND OBSTICLES.
- PROBLEMATIC LZ's.
- PRACTICAL EXAMPLES OF LZ's



**LANDING ZONE OFFICER**

# LANDING ZONE OFFICER

- LIAISON BETWEEN SCENE AND FLIGHT DESK. (ONE POINT OF CONTACT)
- ROLES AND RESPONSIBILITY OF LZ OFFICER.
  - IDENTIFY A SAFE LZ.
  - LZ PREPARATION.
  - DESIGNATE A LZ MARKER.
  - LZ SAFETY.
  - COMS WITH THE AIRCRAFT. (RADIO LICENSE)



**LANDING ZONE MARKER**

# LANDING ZONE MARKER

- MARSHALL APPROACHING AIRCRAFT INTO A SAFE LZ.
- **NB!! DON'T ATTEMPT MARSHALLING IF YOU DON'T KNOW WHAT YOU DOING.**
- ARMS UP, WILL INDICATE TO THE PILOT WHERE THE LZ IS.
- DON'T STAND IN THE MIDDLE OF THE LZ, OFF TO THE SIDE.
- ALWAYS MAKE SURE THE WIND IS AT YOUR BACK.
- DON'T WAVE...



# LZ MARKER SAFETY EQUIPMENT

- EAR PROTECTION.
- EYE PROTECTION.
- REFLECTIVE BIBS/JACKETS.
- HELMET/ALL IN ONE.
- LIGHT WAND/BATS.
- REFUSE BAGS.





# LANDING ZONE MARKER





# EXAMPLE OF MARSHALLING – DAYTIME



# EXAMPLE OF MARSHALLING – NIGHTTIME





# LANDING ZONE PREPARATION

# SIZE MATTERS...

- MUST BE AT LEAST 30 X 30 METERS FOR DAY-TIME OPS.
- 50 X 50 FOR NIGHT-TIME OPS.
- IF POSSIBLE, STICK TO **50 X 50** JUST SAFER FOR ALL.



# LANDING ZONE

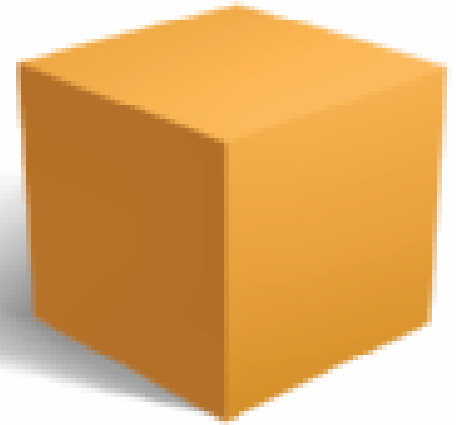
- IS THERE SPACE FOR THE AIRCRAFT?
- SAFETY EQUIPMENT AND RECOURSES.(E.G. FIRE/RESCUE, LAW ENFORCEMENT)
- LZ WALKTHROUGH, LOOK AT THE SURFACE.
- PERFORM A 360° OBSERVATION AND REPORT YOUR FINDINGS.
- LOOK **UP** FOR ANY OBSTACLES.
- WALK THROUGH IN A “Z” PATTERN, REVERSING YOUR PATH ON THE RETURN.
- BE ON THE LOOKOUT FOR TRASH OR DEBRIS.
- EMS, BLANKETS, LOOSE CLOTHING, CAPS, ETC.

# THINK!

2D



3D



- THINK IN **3D** NOT **2D**...
- **30M UP, THE WORLD LOOKS DIFFERENT (AND ITS NOT FLAT)**



# WHAT WE SEE...

- FROM THE AIR.
- FROM THE GROUND, LOOKING UP.





# LANDING ZONE SAFETY EQUIPMENT

- NICE TO HAVE VS MUST HAVE.



# FIRE EXTINGUISHER



# DEMARCATION INDICATORS





# WIND DIRECTION INDICATOR

- **WIHLS – Wind Indicator for Helicopter Landing Sites.**
- Visible from the air.





# WINDSOCKS





# SMOKE





# LIGHTS/LZ KITS FOR NIGHT-TIME OPS

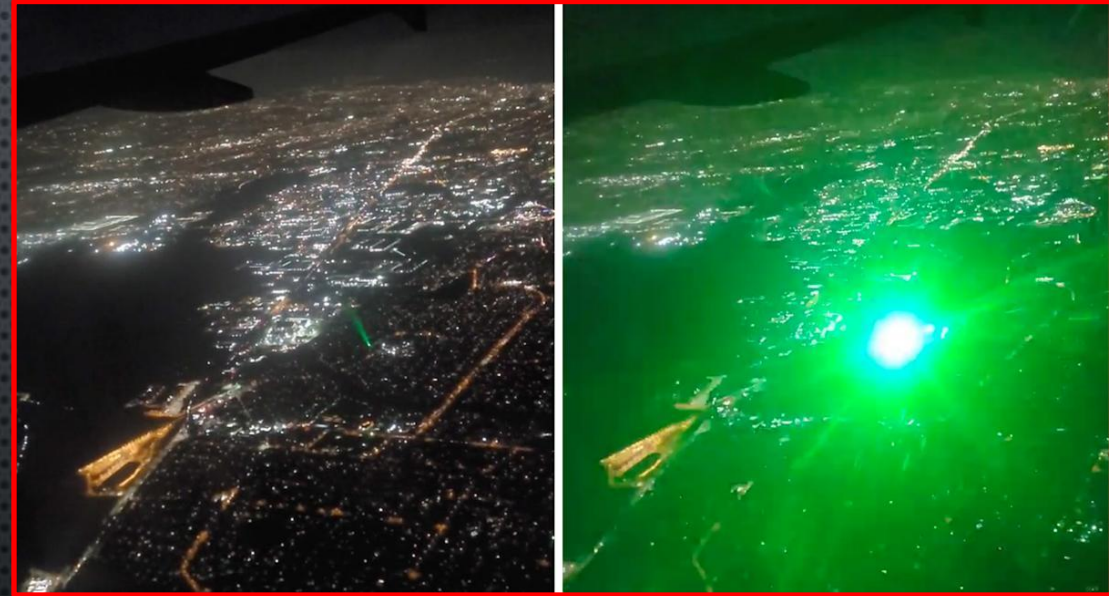








# FLARES, BRIGHT LIGHTS, LASERS

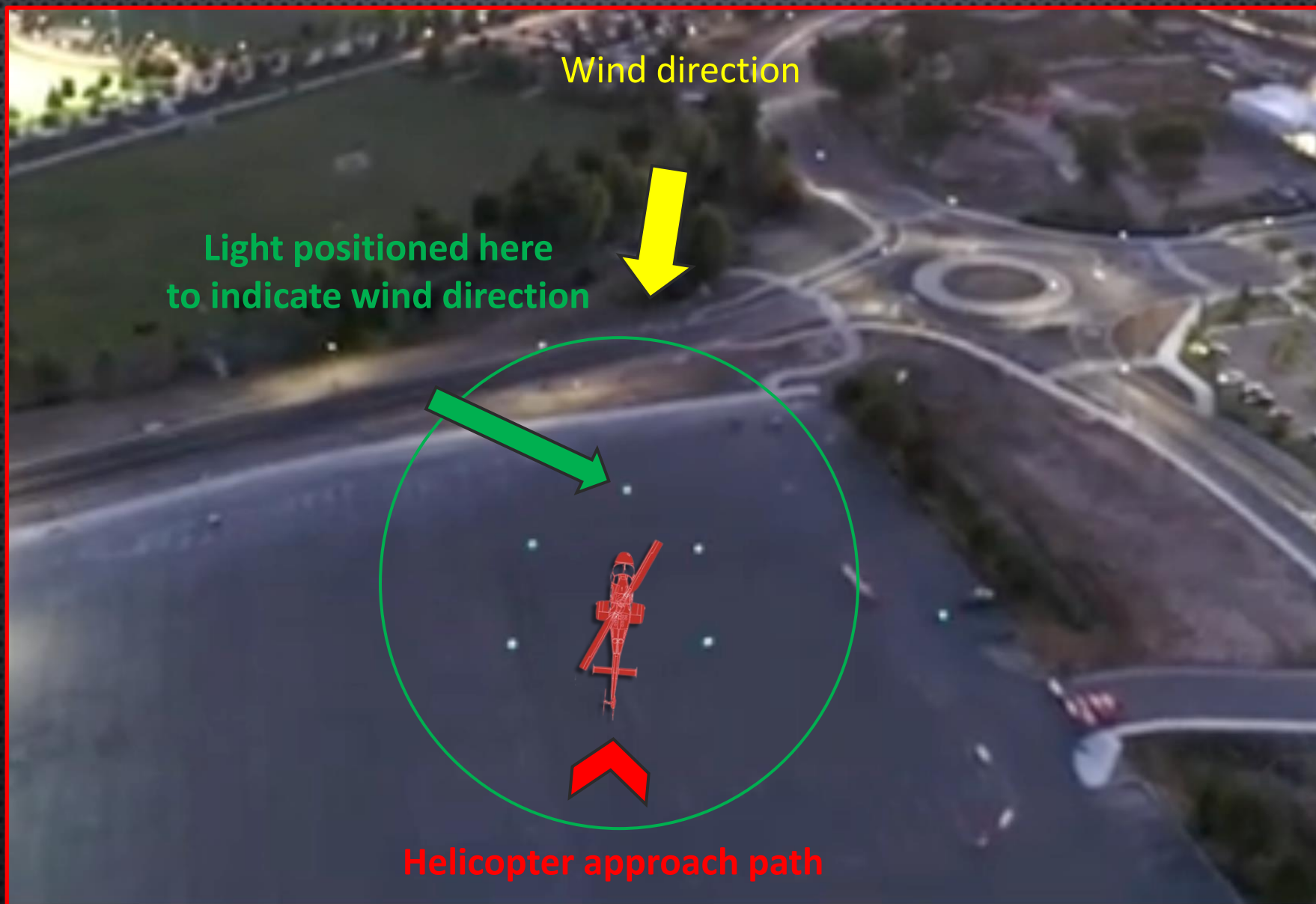










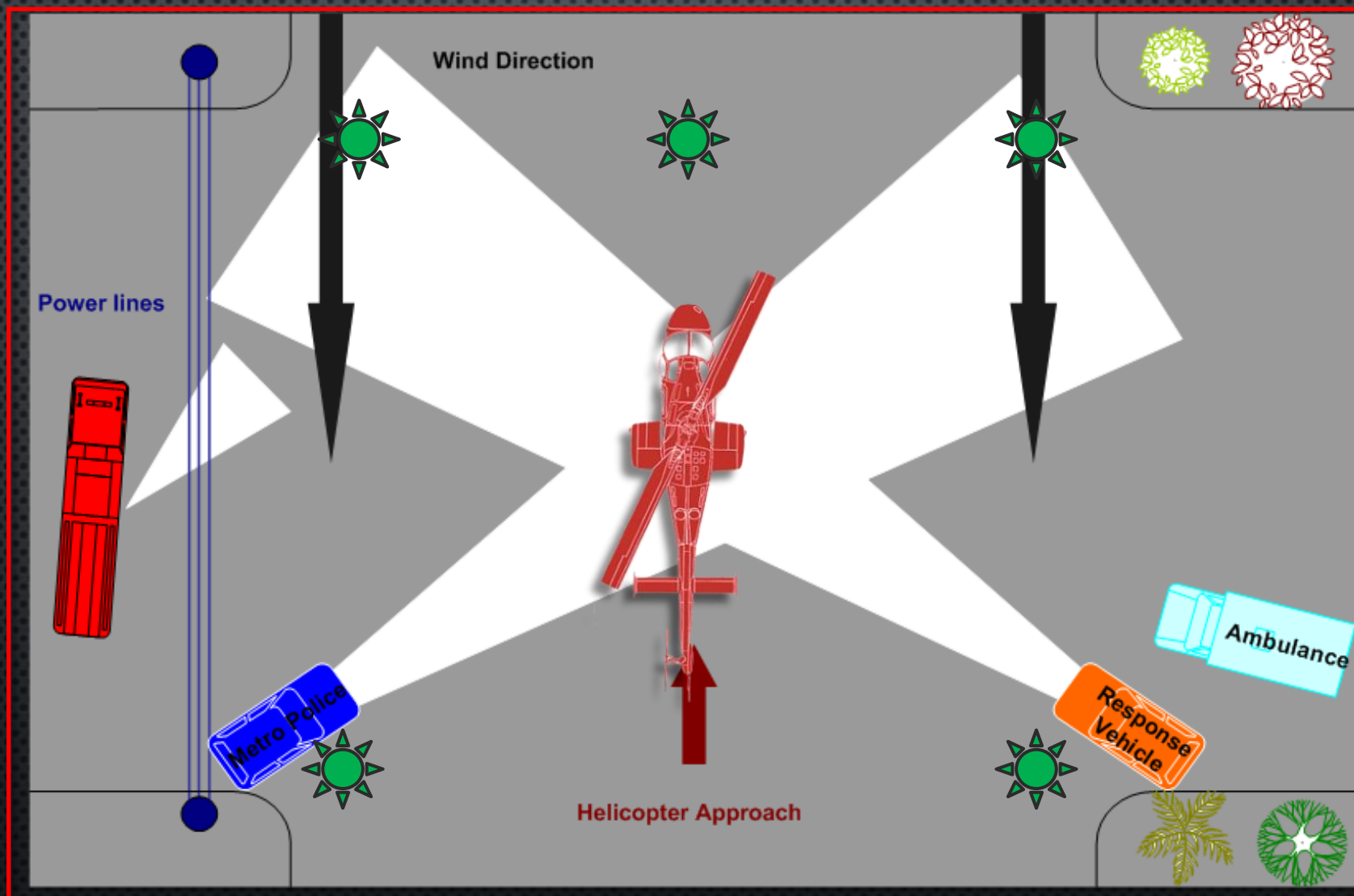


# EMERGENCY VEHICLES AT NIGHT



...land in front of the ambulance with the flashing lights...





# LANDING ZONE HAZARDS AND OBSTACLES



# HAZARD

- WHAT IS A HAZARD?
  - ...ANYTHING WITH A POTENTIAL TO CAUSE HARM...
- LIST SOME HAZARDS...?
  - ?

**TRASH TO THE NEXT LEVEL...**





# DEBRIS/TRASH





# BYSTANDERS AND CROWDS









# ANIMALS...







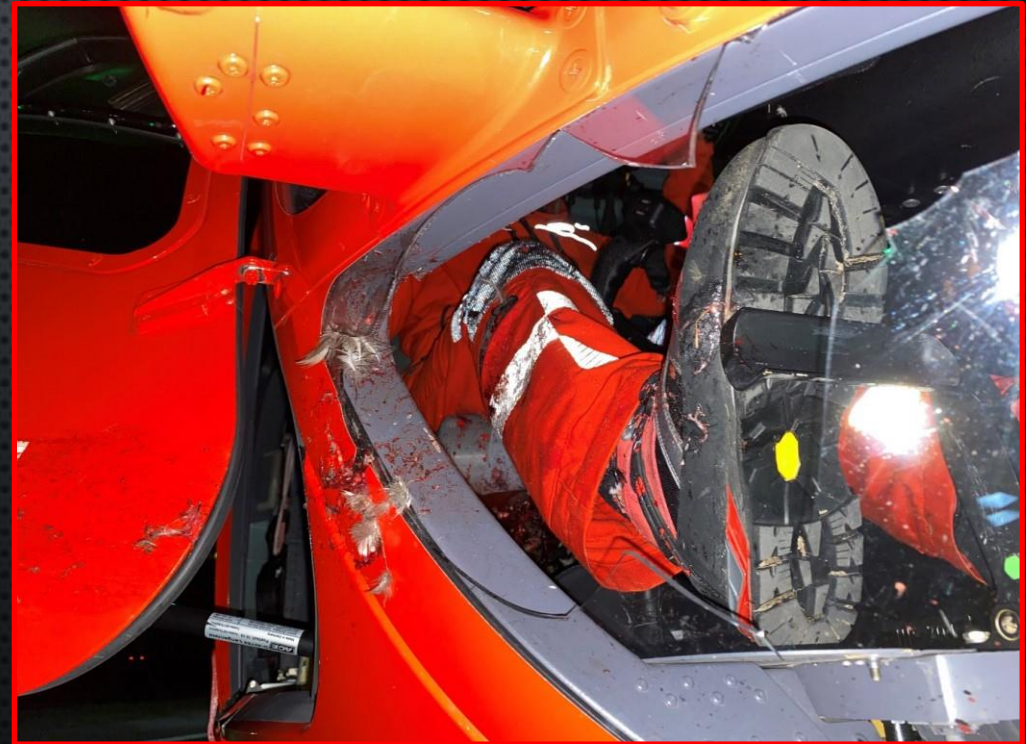


BIRDS...





# BIRD STRIKES





# OBSTACLE

- WHAT IS AN OBSTACLE?
  - ...A THING THAT BLOCKS YOUR WAY...
- LIST SOME OBSTACLES...





# OBSTACLES





# PROBLEMATIC LANDING ZONES

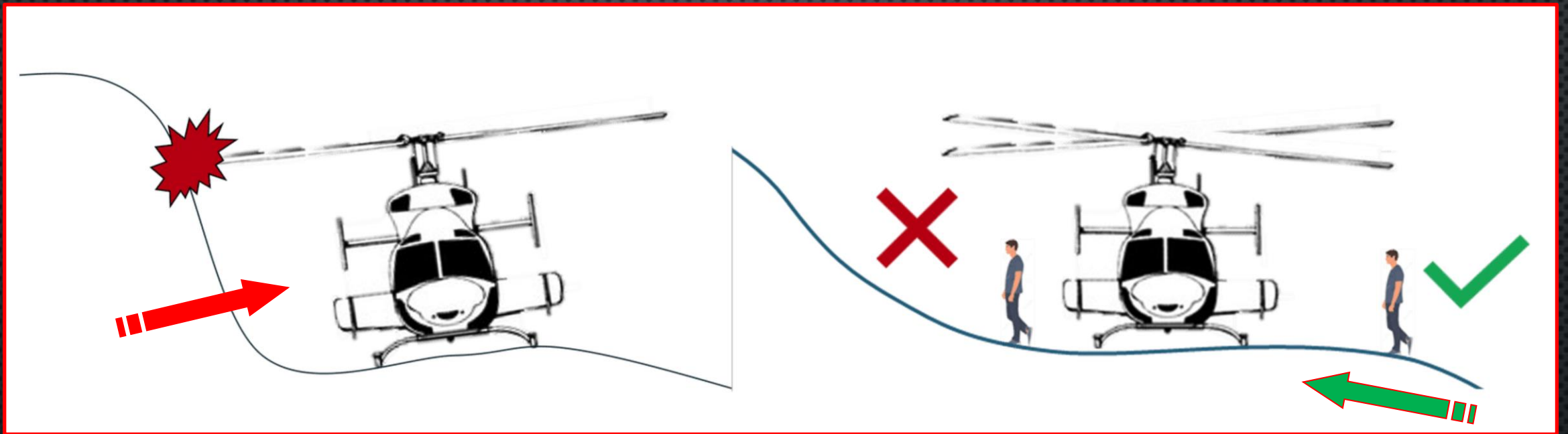
# SLOPES



No more than 5° should be safe.



# DANGER AREA!



**DANGER AREA**  
Do not approach

Approach to  
load on this side



# TALL GRASS





**DIRT, DUST, GRAVEL...**



# PRACTICAL EXAMPLES OF LZ'S











































FOR A SAFE LZ REMEMBER THE FOLLOWING.

FOUR **W'S** AND FOUR **S'S**,

- FOUR **W's**
  - **W**IND, **W**IRES, **W**AY IN **W**AY OUT.
- FOUR **S's**
  - **S**IZE, **S**HAPE, **S**LOPE, **S**URFACE .



# **PATIENT LOADING AND PACKAGING**



# PATIENT LOADING AND PACKAGING

- ALWAYS OBEY COMMANDS FROM THE FLIGHT CREW.
- BRIEFING., **CREW SHOULD GIVE SHORT BRIEF.**
- SET UP OUTSIDE OF THE ROTOR DISK AREA.
- MINIMUM AMOUNT OF PEOPLE TO THE AIRCRAFT, 4 TO 6. (LIFT UP TO THE LOADING SYSTEM)
- LOAD AND GO...
- SECURE PPE...
- FOR EMS PROVIDERS. PACKAGE THE PATIENT.
  - IF NO VACUUMATRESS AVAILABLE USE A SCOOP NO SPINE BOARDS, **THIS IS THE 20<sup>TH</sup> CENTURY, NO MORE SPINE BOARDS.**
- SECURE LOOSE OBJECTS, SHEETS, CAPS, LOOSE CLOTHING ETC.



# PATIENT LOADING AND PACKAGING





# PATIENT LOADING AND PACKAGING





# AIRCRAFT APPROACH



**DANGER**

**HELICOPTERS  
OPERATE IN THIS AREA**

**IF YOU FIND YOURSELF WALKING TOWARDS  
A BIG NOISY THING WITH SPINNING BLADES,  
TURN THE F\*\*K AROUND EINSTEIN!**

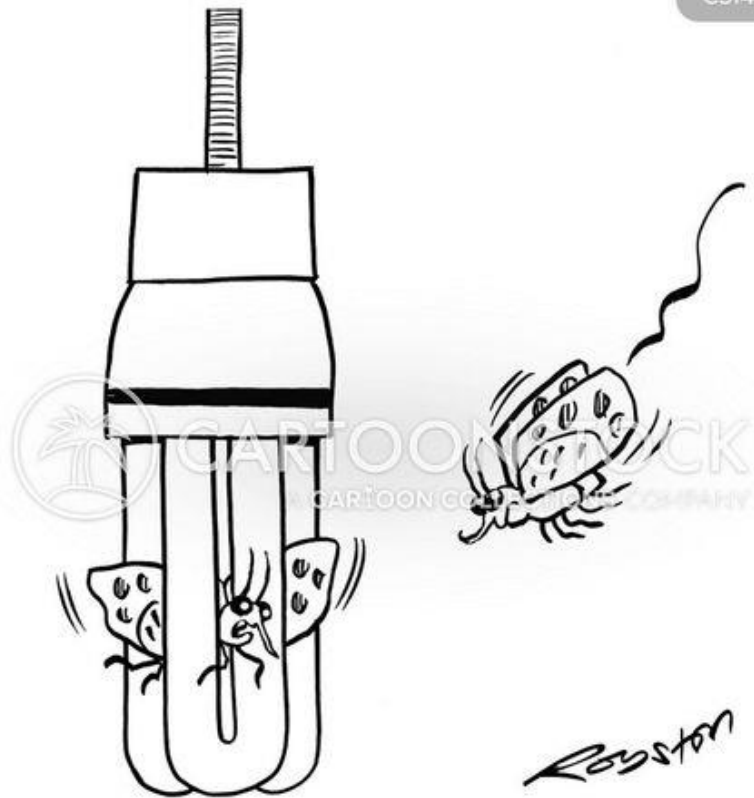


# AIRCRAFT APPROACH

- ALWAYS APPROACH HELIS FROM THE FRONT !!
- WAIT FOR THE PILOT OR CREW FOR A SIGNAL.
- ALWAYS OBEY THE CREW'S INSTRUCTIONS.
- APPROACH THE HELICOPTER IN A CROUCHED POSITION.
- DON'T WALK UNDER THE TAIL BOOM. (EVEN DURING A SHUT DOWN)
- HOT LOADS! (MEANING THE HELICOPTER WON'T SHUT DOWN WHILE ON THE GROUND) (WAIT FOR A BRIEF FROM THE CREW)
- STAY AWAY FROM THE TAIL ROTOR!!
- NEVER APPROACH HELIS FROM THE BACK !!



CS146670



"This never used to happen in the old days."



*"It sort of makes you stop and think, doesn't it."*



# APPROACH!

SAFE!  
to  
Approach  
from  
here!



Approach the helicopter from the front, in a crouched position when the blades are turning, in view of the pilot!



# DANGER AREA!



**DANGER  
AREA!**  
do  
not  
approach!





KEEP  
CALM

AND

DONT WALK INTO  
THE TAIL ROTOR



# TAIL ROTOR






# MAIN ROTOR





# POSTER AVAILABLE ON THE LINK...



**ROCKET**

**HEMS**  
HELICOPTER EMERGENCY MEDICAL SERVICES


**FLIGHT  
AUTHORISATION  
CRITERIA**

**0060 FLIGHT**  
**OR 007 200 5555**

## MEDICAL CALL-OUT CRITERIA


- HEAD INJURIES** with an initial GCS of between 5 and 12 out of 15, or with focal neurological deficit
- STROKE PATIENTS** where time to a stroke centre can be significantly reduced by air transport
- HYPOTENSIVE PATIENTS** with a systolic blood pressure of less than 80mmHg despite attempted haemorrhage control, fluid resuscitation and/or inotropic support
- RESPIRATORY DISTRESS** despite oxygenation, where advanced airway management or mechanical ventilatory support is deemed necessary
- SUSPECTED MYOCARDIAL INFARCTION OR UNSTABLE ARRHYTHMIA** where time to definitive care can be significantly reduced by air transport
- NEAR DROWNING** with haemodynamic compromise despite resuscitation attempts
- OBSTETRIC / NEONATAL EMERGENCIES** where specialist care is not immediately available
- SUSPECTED SPINAL INJURY** with or without neurological deficit, where transfer times by road are extended or terrain may prove detrimental to patient outcomes
- THREATENED LIMBS** with significant vascular compromise
- PENETRATING TRAUMA** to the head, neck, thorax and/or abdomen involving underlying organs or vascular structures
- BURNS** in adults with a BSA of 20-80% or in children with a BSA of 10% or more, or burns to the face, neck and chest with potential airway compromise
- REFRACTORY ANAPHYLAXIS**
- ELECTROCUTION** with unstable arrhythmia or neurological deficit
- HYPOTHERMIA < 35°C or HYPERTHERMIA > 40°C** patients requiring advanced interventions and/or management, not immediately available
- LIFE THREATENING MEDICAL CONDITIONS** that require advanced interventions and/or management that is not immediately available
- ANY SIGNIFICANT MEDICAL CONDITION** where the expertise of medical flight crew is likely to benefit patient outcomes

**! SHOULD YOU, AT ANYTIME, BE UNSURE WHETHER OR NOT A PATIENT WILL BENEFIT FROM A MEDICAL FLIGHT PLEASE DO NOT HESITATE TO ESCALATE THE MATTER TO OUR DISPATCH CENTRE, WHERE WE WILL BE HAPPY TO ASSIST**



### 'PATIENT PACKAGING' : Air Ambulance Preparation for Aero-Medical Transportation


- A Airway:** Patent; C-Spine immobilization; Intercoastal Drain for suspected Haemo-/ Pneumo-Thorax; Naso-gastric tube; C-Spine and Chest X-ray where possible
- B Oxygenation:** 40% Oxygen Facemask / Ventilated - 'Resusbag' with reservoir
- C Circulation:** Haemorrhage control; Urine catheter
- D Drips:** At least one large bore and patent
- D Drugs:** Have Special drugs been administered or are they required
- D Dressings:** All wounds to be dressed with clean dressings where possible
- E Evacuation:** Call as early as possible; Furnish as much information regarding patient Diagnosis & Condition; Inter-Facility Transfer and Medical cover information where applicable; Passengers accompanying patients will only be accommodated with prior arrangement
- F Fractures:** Splint all - 'Backslab' / Kramer Wire splint; Bi-valve POP casts



### PRIMARY (SCENE) CALL INFORMATION

1. Park the police, fire or ambulance vehicle directly under any power lines or cables that may cross the roadway near the landing zone
2. Stand with your back to the wind 10 metres from where you want the helicopter to land
3. Secure the landing zone (approx. 30 m X 30 m) against all loose or light debris
4. Allow no persons but dedicated rescue personnel within 50 metres of the helicopter
5. Ensure the landing zone is as level as possible.  
If not, DO NOT approach the helicopter from the uphill side. Communicate with the helicopter via radio if possible.  
Do not approach the helicopter unless the flight crew requests you to do so
6. Do not activate smoke grenade in centre or upwind of landing zone
7. Control the crowd and bystanders

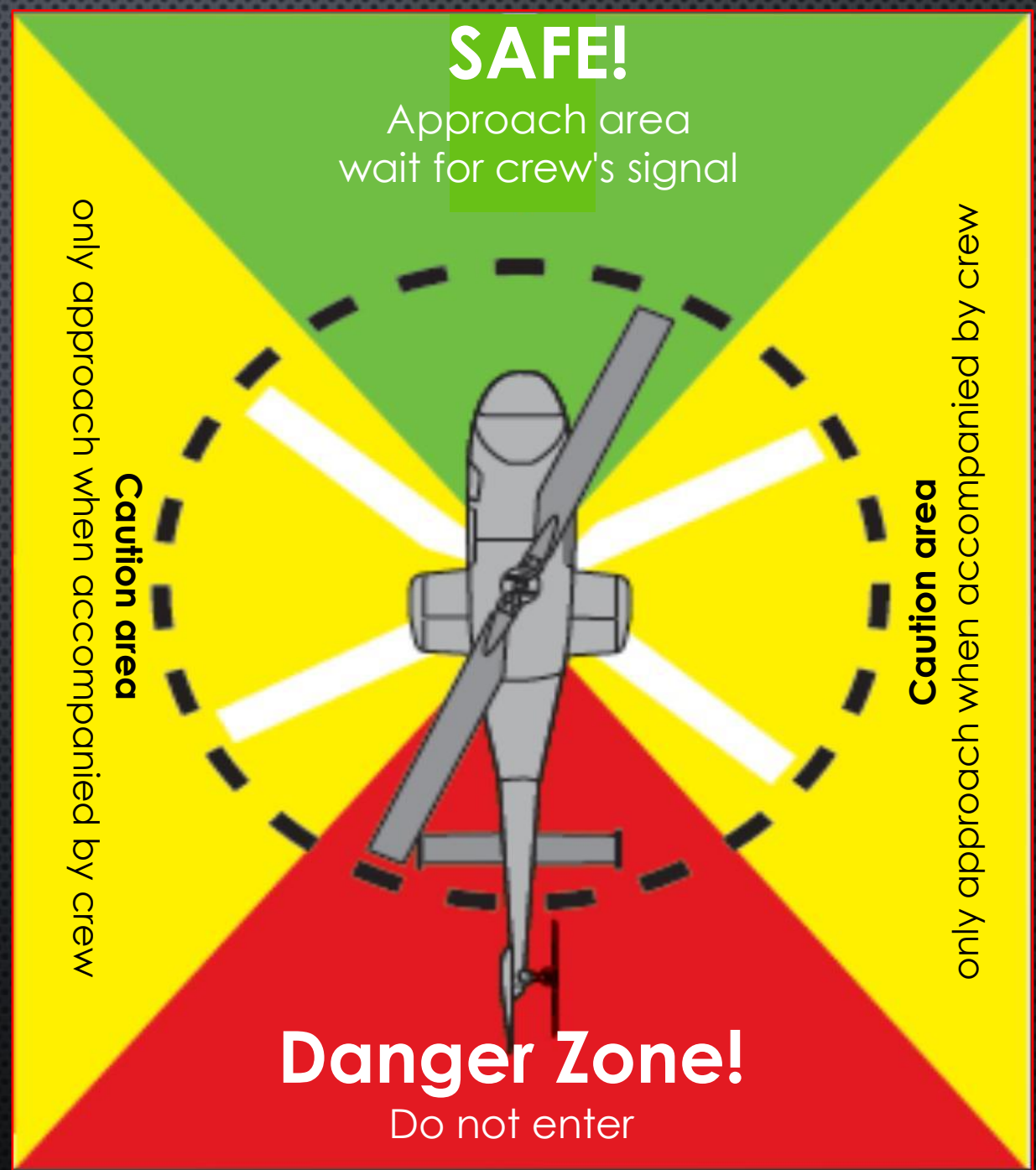
### SAFETY RULES AROUND THE HELICOPTER



1. Always wait for the pilot's signal before approaching the aircraft
2. Approach/depart the helicopter from the **GREEN AREA ONLY**
3. Keep low and walk to and from the helicopter **NEVER RUN**
4. At the helicopter, LISTEN for and obey the crew members' instructions
5. All loose items on the stretcher must be **SECURED**  
Carry all long items **HORIZONTALLY** only
6. NEVER approach/depart or step in the **RED AREA**
7. HATS/CAPS and HELMETS should be strapped onto your head or not worn at all
8. Do not bring vehicles within 30 metres of the helicopter
9. DO NOT SMOKE around the helicopter



# SAFETY CARD







**BE PREPARED**

YOU HAVE NO IDEA WHEN THE SHIT STORM WILL ENSUE



# AIRCRAFT DEPARTURE



# AIRCRAFT DEPARTURE

- LEAVE THE HELICOPTER IN A CROUCHED POSITION, WALK BACK.
- KEEP THE LZ SAFE UNTIL YOU CAN'T HEAR THE AIRCRAFT ANYMORE.
- THE LZ WAS A SAFE PLACE, AND THE PILOT MIGHT WANT TO RETURN TO THE LAST KNOWN "SAFE" PLACE...



**DEBRIEF**



# DEBRIEF





# SUMMARY.

- WHY ALL OF THIS?
- LANDING ZONES
- PATIENT PACKAGING
- AIRCRAFT APPROACH
- AIRCRAFT DEPARTURE
- DEBRIEF



IT IS A TEAM EFFORT!!

LET'S  
KEEP IT SAFE!!





# REFERENCES

- AEROSSURANCE.COM
- AVIATION SAFETY NETWORK
- FLIGHT AWARE. COM
- FLIGHT PARAMEDICS ASSOCIATION
- BAPTIST LIFE FLIGHT LZ MANUAL
- CARE FLIGHT LZ MANUAL
- CARE FORCE LZ MANUAL
- FAA WEB SITE
- NATIONAL EMS PILOT'S ASSOCIATION
- ASSOCIATION OF AIR MEDICAL RESPONDERS OF OREGON - LZ GUIDELINES
- ROCKET PART 138 COURSE MATERIAL
- RESEARCH PAPERS;
- ARCH AIR MEDICAL SERVICES
- CAMTS ACCREDITATION STANDARDS DOCUMENT, 12<sup>TH</sup> EDITION.