AW139 Offshore Performance

Enhanced Safety for Offshore Helicopter Operations

BERNARDINO PAGGI
AW Flight Test Methodologies

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AW and O&G Business: General Review

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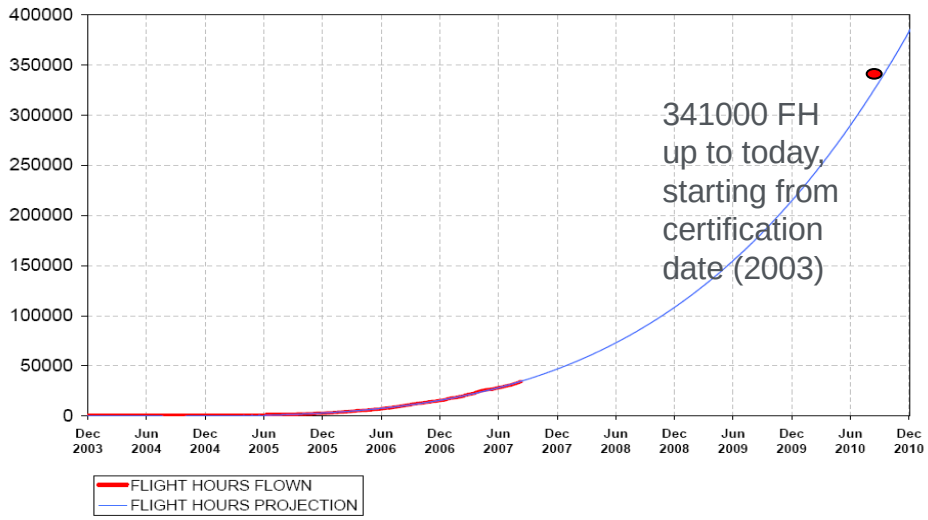
AW and Oil & Gas Business: AW139

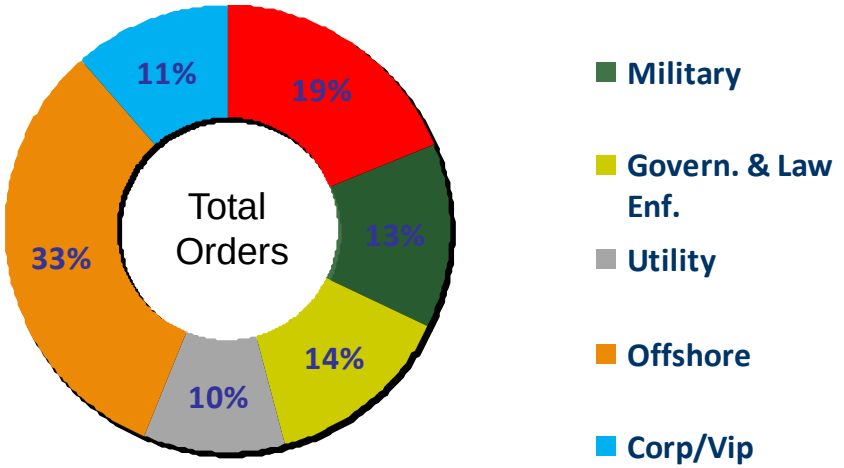
Total Orders > 530 Helicopters

In Service - Total Fleet: 367 Helicopters
- in Offshore: 150 Helicopters

Flight Hours - Total Fleet: 341.000 FH

Fleet Leader - Helo s/n 31041: >5870 FH





AW and Oil & Gas Business: AW139

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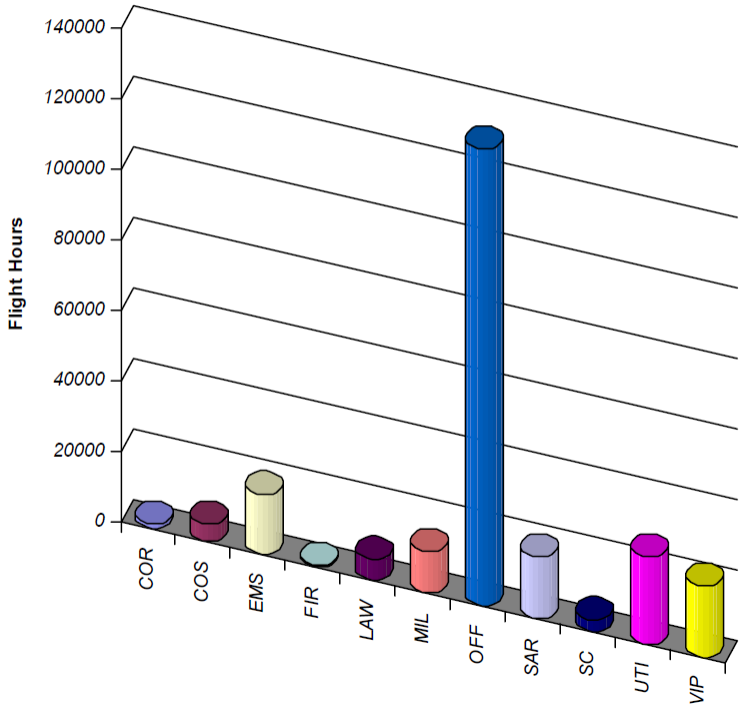
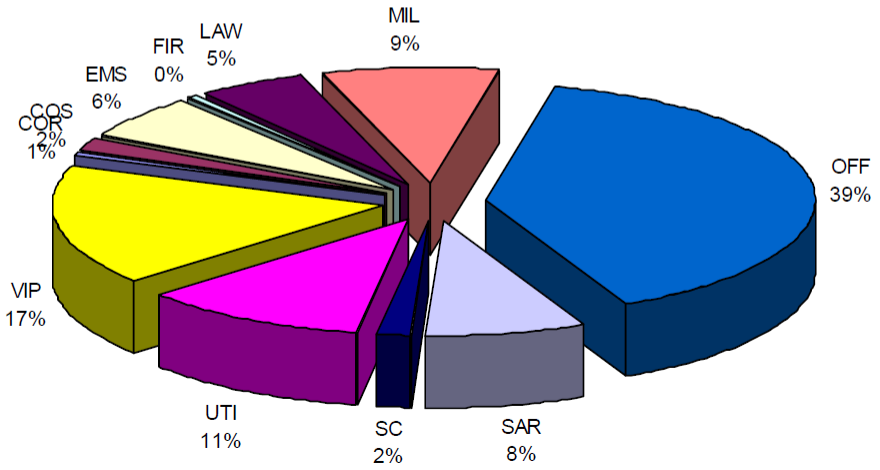
FLIGHT HOURS PER SEGMENT OF OPERATION



CHA : Charter
COR : Corporate
EMS : Emergency Med. Service
HPS : Harbour Pilot Services
LAW : Law Enforcement
OFF : Off Shore
UTI : Utility
VIP : VIP
Exp : Experimental

COS : Coast Patrol
FIR : Fire Fighting
MIL : MIlitary
SAR : Search and Rescue
TRA : Training



Operational status

Offshore Operators

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- Abu Dhabi Aviation (Abu Dhabi)
- Atlantic Airways (Denmark)
- Canadian Helicopter Corporation
- ChevronTexaco (USA)
- ERA / SEACOR Helicopters (USA)
- EuroAsia air (Kazakhstan)
- Evergreen (United States)
- Gulf Helicopters (Qatar)
- Heliportugal (Portugal)
- Grupo INAER (Spain)
- NZ Helicopters (New Zealand)
- Saudi Aramco (Saudi Arabia)
- Senior Taxi Aereo (Brazil)
- Petroleum Air Services (Egypt)
- Bel Air (Danmark)
- Bristow Group (USA)
- VIH Cougar Helicopters (Canada)
- PHI (USA)

... And more and more Oil&Gas companies

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PC1/PC2e from Oil Rigs

Offshore Performance

- Original Offshore Performance Objective was CAT A/PC1
- Diluted Operationally to PC2e – significant concessions below PC1, but same basic objectives:
  - Safe Reject
  - Deck Edge Clearance
  - Sea Surface Clearance
  - i.e. ‘Zero Exposure’
- Can be provided by analysis

PC2e is not a very high Performance Standard

Offshore Performance

- JAR-OPS 3.517:

"the take-off mass takes into account: the procedure; deck-edge miss; and drop down appropriate to the height of the helideck -with the critical power unit(s) inoperative and the remaining power units operating at an appropriate power rating."

- The meaning of this is absolutely clear:
  - Zero Exposure
  - Safe Reject
  - Deck Edge Miss
  - Sea Surface Separation

Anything less than this is 'diluting the intention of the Rule'

Offshore Performance

- Current Perceptions (not Reality)
  - Accounting for engine failure requires dangerous manoeuvres
  - Risk of the PC2e Manoeuvres is greater than the risk of an engine failure
  - Impossible to meet PC2e
  - Delay/Delete/Dilute JAROPS 3 PC2e
  - Some proposals to rely on low probability of engine failure (PC2d)

Any potential problems caused by lack of performance (power), not accounting for engine failure

Offshore Performance

- Risk Analysis Approach:
  - Assumes impractical techniques to calculate risk periods
  - Justifies increased weights above PC2e weights on basis of techniques that realistically cannot be flown!
  - Result - EVERY T/O and LANDING WILL HAVE RISK - much greater than calculated
- Allowing more than Zero Exposure will take away all incentive for Manufacturers to provide Operating Industry with Good Performing Helicopters with appropriate techniques

Regulation should force design change

Offshore Performance

- Reality
  - Good Performance for PC2e also equals good AEO margins
  - Improved Deck Environment manoeuvring safety
  - Ability to deal with more operational factors
  - Improved Crew awareness of Performance Issues/Risks
  - Engine Failure Accountability is a good influence for Safety – it MUST not be disregarded

POWER = POWER = HIGHER SAFETY

LOW POWER + LACK of REGULATORY RESOLVE = REDUCED SAFETY

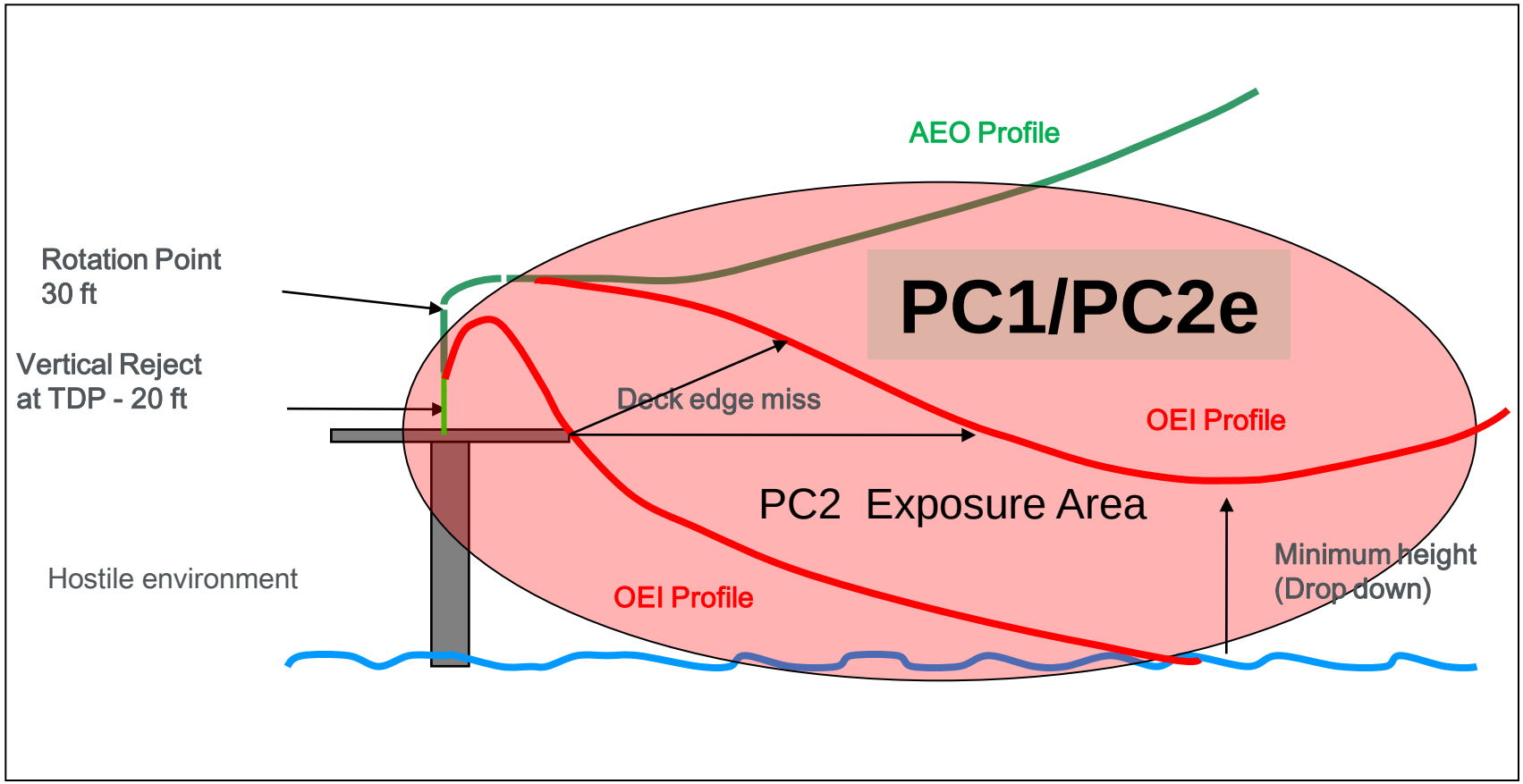
AW139 Offshore Profiles

- Continuously Descending Approach
- Level Approach
  - Slow/Low LDP close to deck (15Kts GS and 50/40 ft)
  - LDP in similar place to normal offshore ‘Committal Point’
  - Not Special Techniques

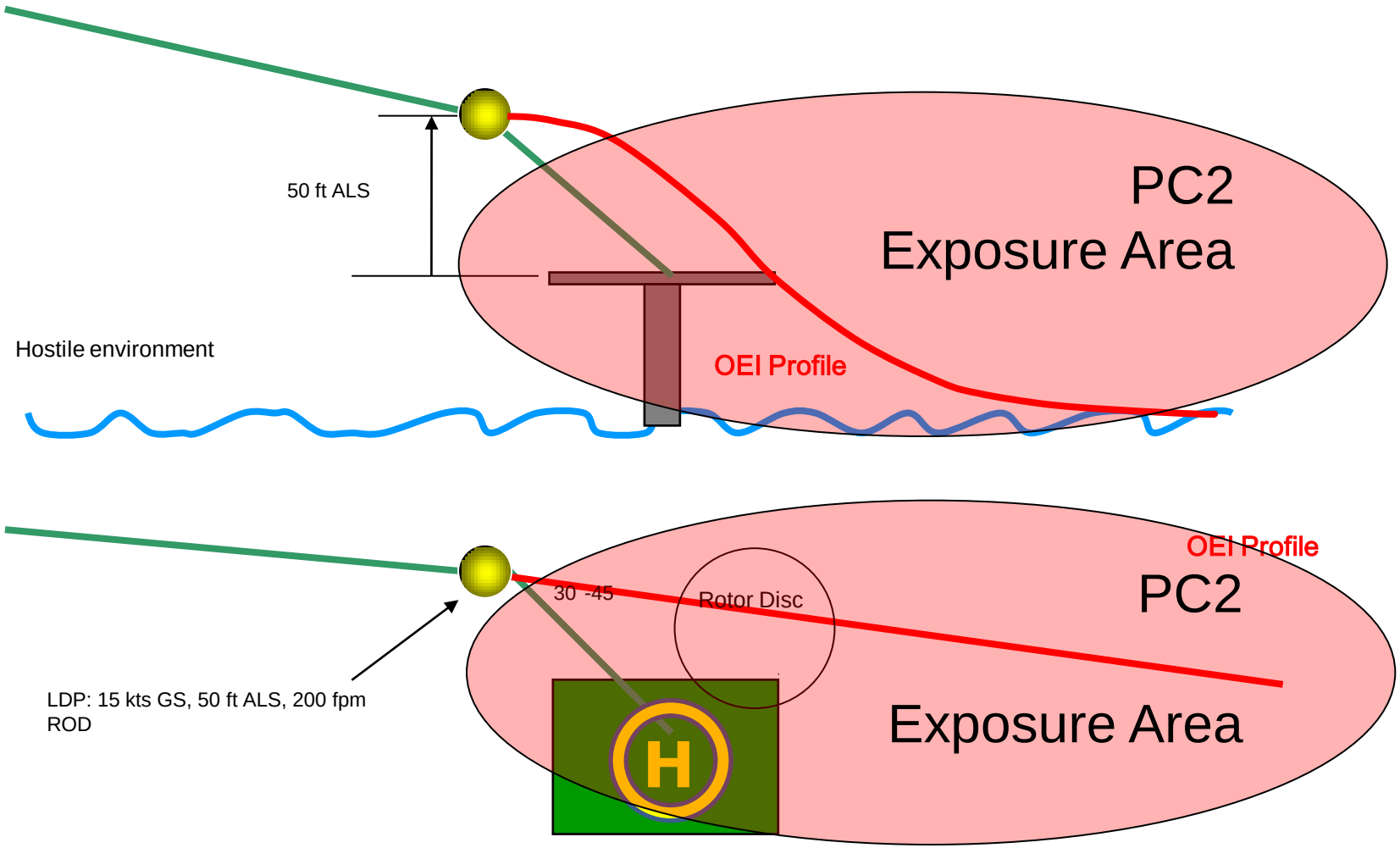
Figure 2I-8 Descending Approach Landing On Helideck - View RH Seat at LDP (15 kts, 50ft ALS, 200 fpm ROD)

Figure 2I-9 Descending Approach Landing On Helideck - View RH after LDP descending to landing point

Take Off Exposure



Landing Exposure



Landing Without Exposure

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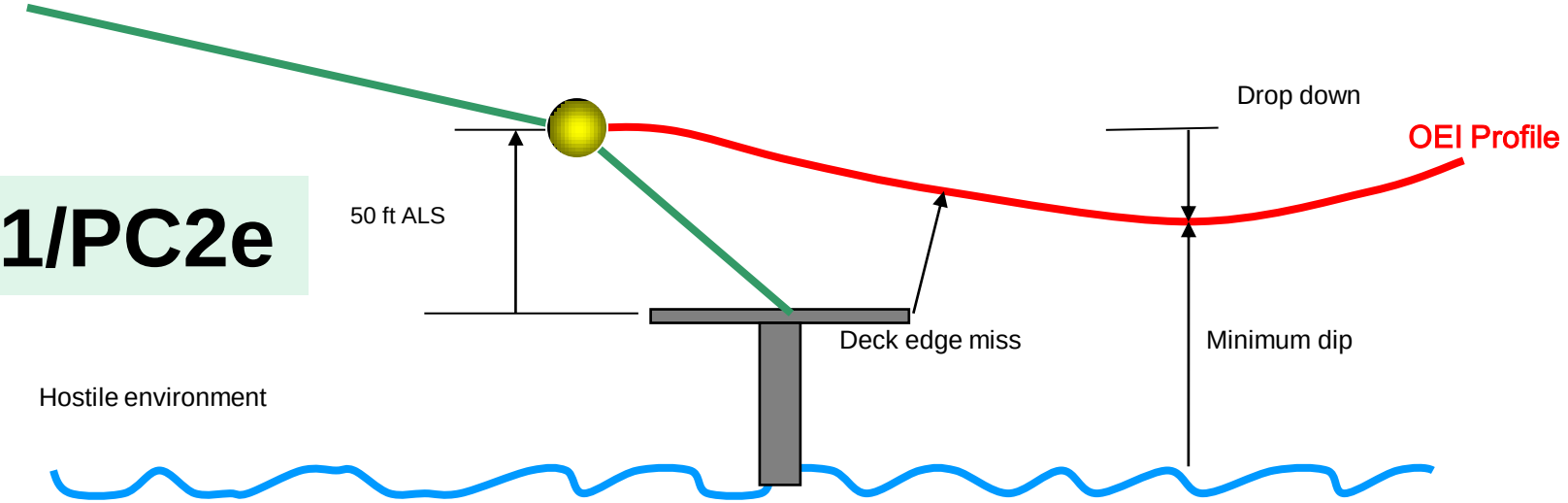
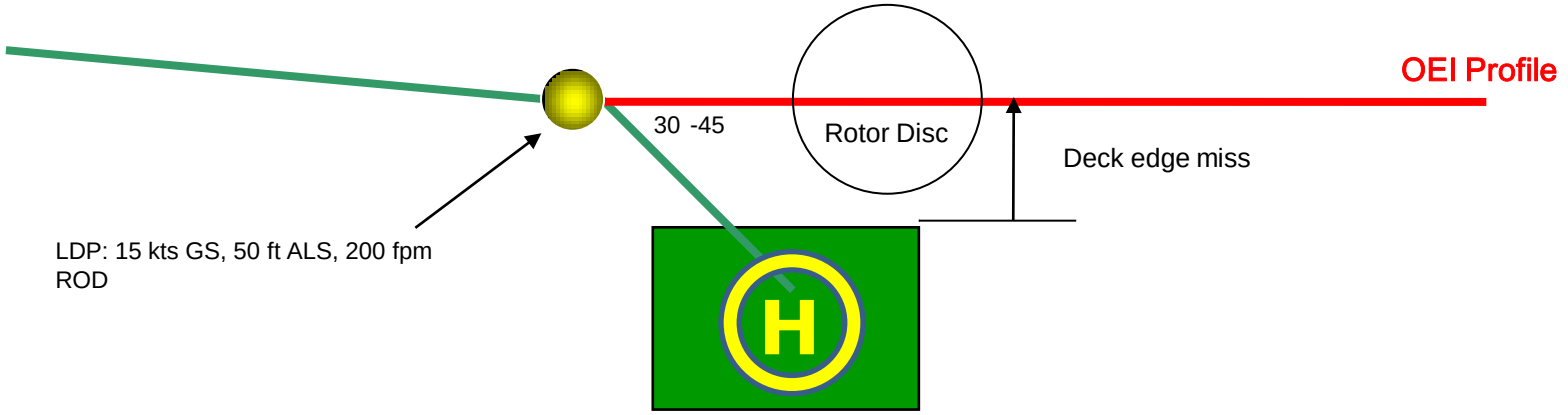
PC1/PC2e





Power Margins

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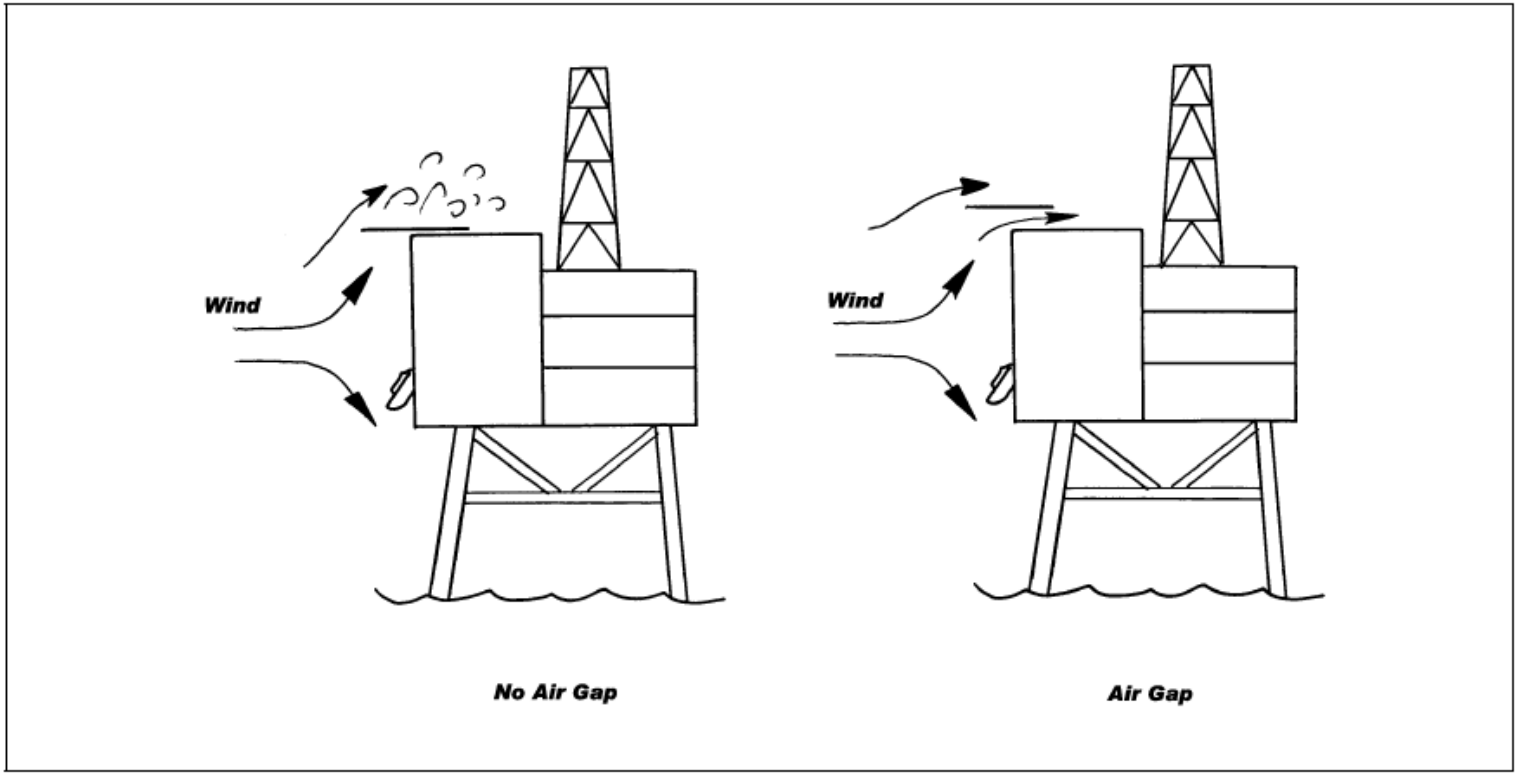
AW139	PC2	PC2	PC1/PC2e	PC1/PC2e	PC2	PC1 vs PC2	
	EXPOSURE Assured Forced Landing	EXPOSURE No Assured Forced Landing	NO EXPOSURE Safe RTO & CTO	NO EXPOSURE Safe RTO & CTO	EXPOSURE No Assured Forced Landing		
Ambient Conditions	Max Take Off Weight (150 fpm OEI) Kg	Max Take Off Weight (HOGE@TOP) Kg	Cat A Procedures Kg	AEO HIGE Power Margins @ Cat A Weight TQ %	AEO HIGE Power Margins @ HOGE TOP Weight %	Zero Wind Delta Weight Cat A/TOP HOGE Kg	10 kts Head Wind Delta Weight Cat A/TOP HOGE Kg
ISA SL	6800	6800	6800	25	25	**0**	**0**
ISA SL +10	6800	6800	6650	24	22	**-150**	**0**
ISA SL+15	6800	6775	6550	25	23	**-225**	**0**
ISA SL+20	6800	6750	6480	25	22	**-270**	**0**
ISA SL+25	6800	6700	6400	25	21	**-300**	**-20**
ISA SL+30	6800	6675	6300	31	21	**-375**	**-100**
ISA SL+35	6600	6650	6200	27	17	**-450**	**-220**

Environmental Limitations

Slow winds from unobstructed area creates over-deck- vortexes



An air gap is required to stabilize the air flow

Slow Wind Performance Penalties

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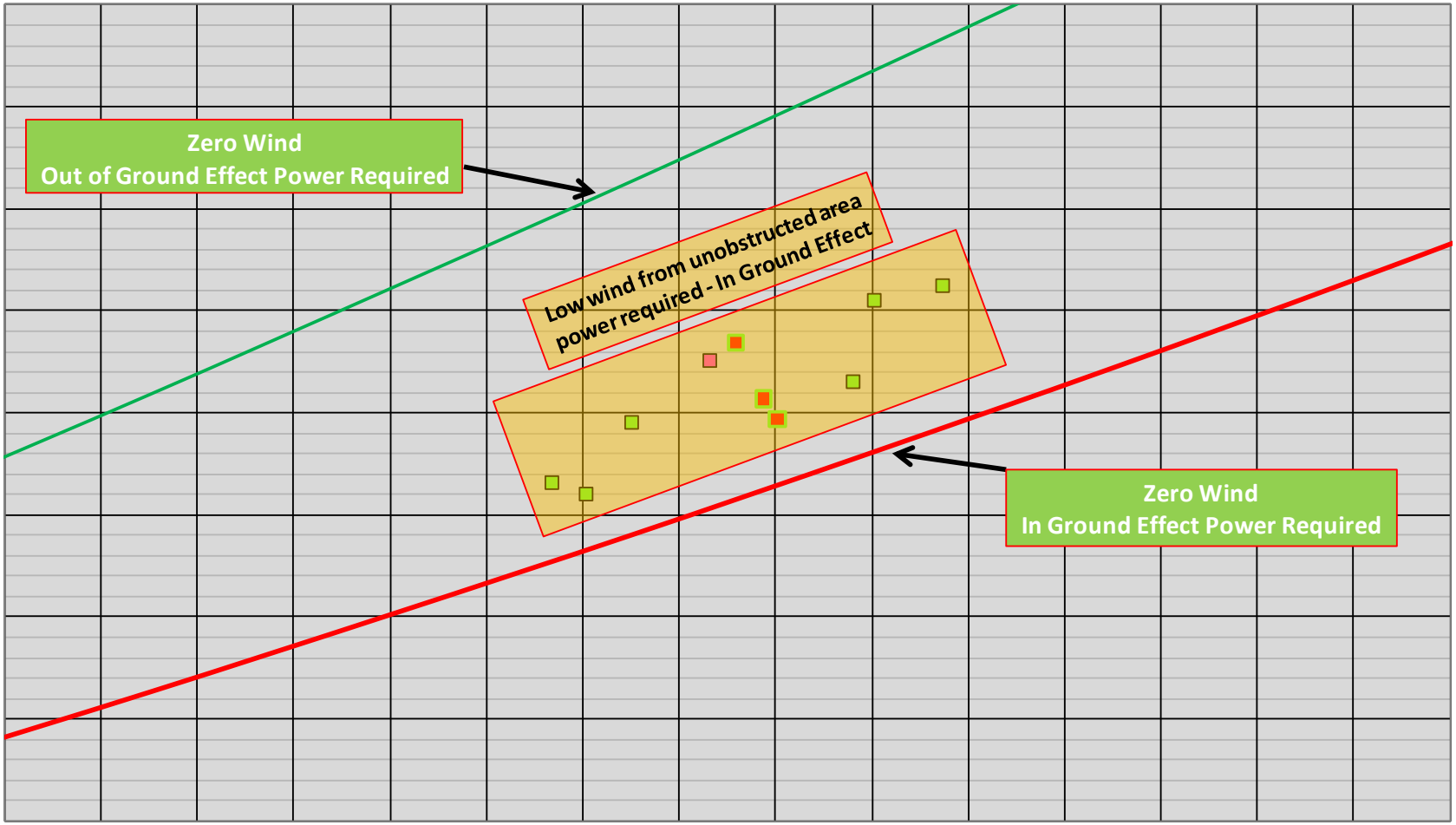

Wind Accountability

- *"(A) for take-off, take-off flight path and landing requirements, accountability for wind shall be no more than 50% of any reported steady head wind component of 5 knots or more."*
- Winds below 15 kts from unobstructed area can be detrimental
- It is recommended not to account for wind benefit if the helideck does not have adequate air gap

Wind Benefit

Good designed helideck allow for wind accountability

	Zero Wind Delta Weight Cat A/TOP HOGE Kg	10 kts Head Wind Delta Weight Cat A/TOP HOGE Kg
ISA SL	0	0
ISA SL +10	-150	0
ISA SL+15	-225	0
ISA SL+20	-270	0
ISA SL+25	-300	-20
ISA SL+30	-375	-100
ISA SL+35	-450	-220


LONG.
LAT.
COLL.
PED.
ATTACK
SIDEBOX

CONCLUSIONS

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- Risk Analysis (Exposure) Methodology
  - Increases Risk (higher weights)
  - Less Accountability for Operational Situations
  - Takes away incentive for OEMs to do better
- PC2e Zero Exposure
  - Improved AEO safety – day to day operations
  - OEI accountability
  - Rational BASIC performance standard

The Way Forward

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- PC2e and Associated AMC should retain objective of Zero Exposure.
- AMC should be ‘European Standard’ to avoid Regulatory Fragmentation
- Proper Consultative Process for Reg/AMC changes
- Consideration to developing rational AEO criteria (Thrust Margin?) to enhance deck manoeuvring safety