TITLE | ***Apron Floodlighting: Lessons Learned***

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MIDSTREAM

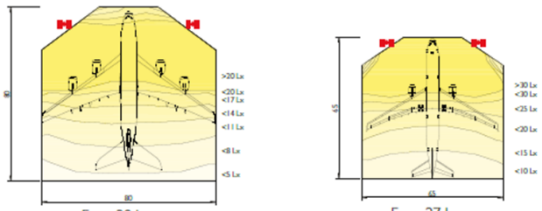
Agenda:

- Introduction
- Lessons
  - L1: Design led solutions
  - L2: Testing and verification
  - L3: Optics rule
  - L4: Pay cheap, pay twice
  - L5: Remote drivers vs integrated drivers
  - L6: Controls and intelligence
  - L7: White vs Yellow light

L1: Design led solution

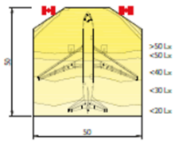
- Apron lighting is different!
  - AGLs are standard products
  - Floodlights differ in:
    - Photometry
    - Power output (lumens)
    - Efficacy
    - Performance over time
  - Can you assume…? You can “ASS U ME”.
  - **Each project bespoke to manufacturer.**

Bespoke design

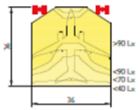


E_{av} - 20 Lux
u_0 - 0.251
Code F

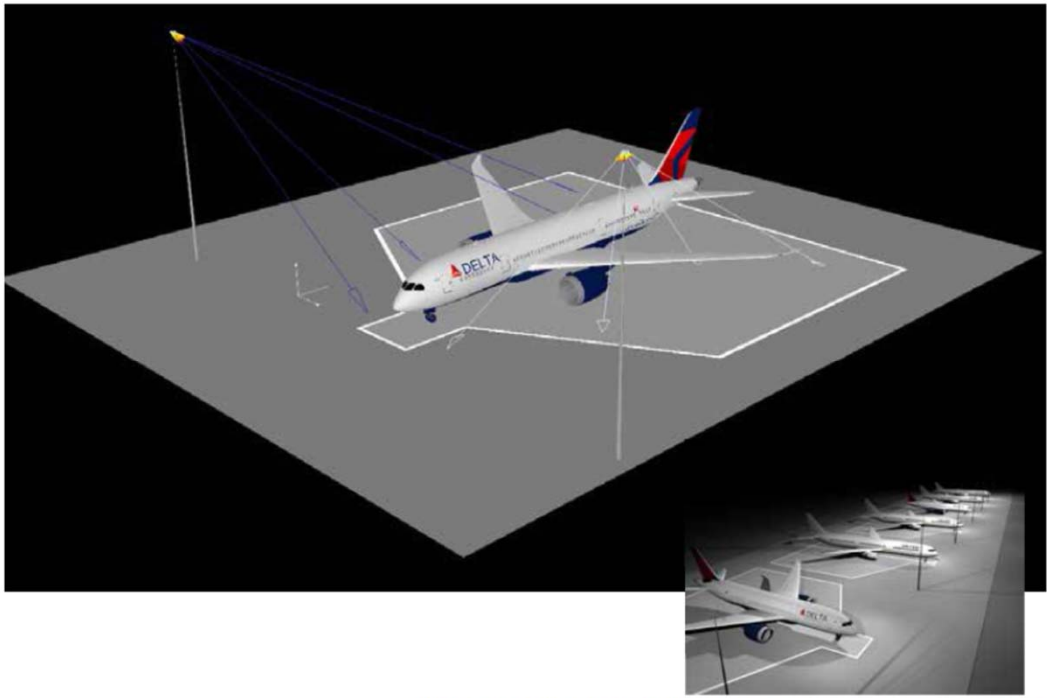
E_{av} - 27 Lux
u_0 - 0.263
Code E



E_{av} - 44 Lux
u_0 - 0.345
Code D



E_{av} - 88 Lux
u_0 - 0.424
Code C



Because our in-house design team was involved in the development of our proprietary refraction lens, they have unique know-how of creating designs for the most challenging environments.

L2: Testing and Verification

- Once you have your design…
- Show of hands… who has completed Apron upgrades?
  - Who complies with IES RP37?
  - Who has tested their apron for compliance when it was installed?
  - Who tested in the last 6 months?
  - Who has a documented methodology for testing?

L2: Testing and Verification

- For LEDs, heat is the enemy. Key to high quality systems is the heat dissipation.
- Frankfurt Airport, 15%-20% reduction in lumen output (40F to 80F)
- Istanbul Airport (8 out of 10 failed)
- **Design, Test, Measure, Verify**

L3: Optics rule

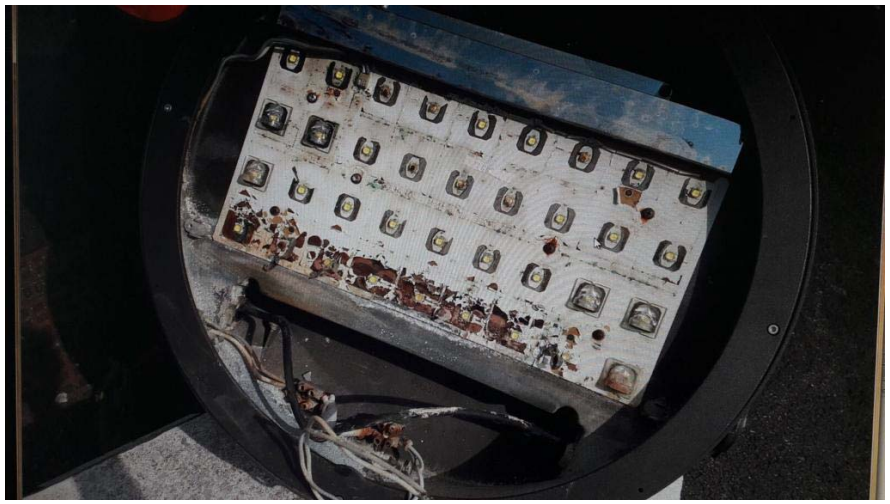
- Airport enemy no 1 is GLARE.
- Asymmetric optics deliver a low glare and full cut off above the horizontal plane
- The asymmetric beam has a lower luminous intensity (cd/klm) peak as it spreads light over a larger angle
- Pilot glare and discomfort complaints

Flat to ground: Asymmetric

L4: Pay Cheap, Pay twice!

- Apron lighting fixtures are critical infrastructure
- Premium products will typically out-last low quality products, and low quality companies!
- Usually the Contractor is looking for margin, but the airport suffers.
- Examples…..
- **HOLD SPEC and go back to L2**

Pay cheap, pay twice



Milan Linate Airport

US Naval Air Station Sigonella

Muscat Int'l Airport

L5: Remote Drivers vs Integrated

- Markets have preferences
  - UK, Italy, Germany integrated
  - France, USA remote
- Typically driven by maintenance cycles
- Habits are hard to change!
- Manufacturers must adapt
- Each operator may have own preference
- **Remember: Surge Arrestors**

L6: Controls & Intelligence

- Controls and IoT are in flavour at the moment
- Wireless, wired, WiFi, RF, push button
- Who is the Owner?
- Who is trained?
- How often is this system utilised?
- What happens when it doesn't work?
- Automation is the future?
- **Good but someone needs to run it!**

L7: Yellow light vs White light

- To obtain the greatest penetration of light through fog, you should use the longest wavelength possible. Red being the longest is obviously unsuitable because it is used for stop lights. So you compromise and use yellow instead.
- WRONG!
- Fog droplets are, on average, smaller than cloud droplets, but they still are huge compared with the wavelengths of visible light. Thus scattering of such light by fog is essentially wavelength independent.
- Car head light designers have known this for years!!!!
- For perception of fog, colour is unimportant
- **YELLOW and WHITE light are equivalent**

THANK YOU
FOR YOUR ATTENTION

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