IES-RP-37-15:
Outdoor Lighting for Airport Environments

A New Recommended Practice for the Aviation Community

Authored by:
The IES Aviation Lighting Committee

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Why RP-37?

2005 IES-ALC formed the sub-committee for Recommended Practice to update the old RP-14-87

The IES RP-37 sub-committee is comprised of :

- Airports
- Manufacturers
- Designers
- Contractors

Sub-Committee members included:

- Richard Larivee, Sub, Chair
- Fred Loeffler, Vice –Chair
- John Wujek, Secretary
- E. Alf
- Carl Johnson
- H.C. Johnson
- H. McKee
- A. Seiterle
- Irwin Smiley
- M. Tebeau
- C. Twibell

Why RP-37?

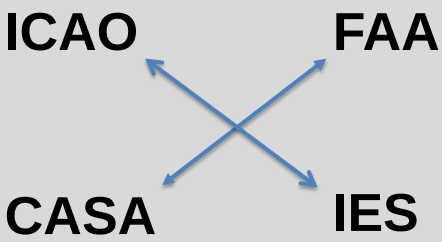
The IES RP-37 was preceded by RP-14-87 from 1987. The old RP provided good general information but……

- Where do you put the light on the apron?
- How much light on the apron?
- What defines the apron?

These questions and the need to educate new personnel to the airport environment with respect to lighting design provided the spark to develop RP-37.

Why RP-37?

Several Airport authorities and organizations have provided some guidance on the location and quantity of lighting at airports over the years.



- All varying standards and recommendations on Lighting…….So,

Why RP-37?

To cover the entire Airport Environment it was evident that the committee needed to provide a Recommended Practice that:

- Defined the areas on the airside and landside
- Describe the activities and operations that occur in these areas
- Describe and define the visual issues specific to the airport environment
- Define the design criteria for the airport areas
- Provide reference to other standards, RPs, Aviation Authority documents

Contents

The content for the RP includes:

1. Introduction
2. Characteristics of Airport Areas
3. Visual Issues
4. Design Criteria
5. Essential Safety and Security Lighting
6. Environmental Considerations

Annexes A through I for supporting Documentation

Lets get started!

1.0 Introduction

This IES Recommended Practice provides guidance to provide an adequate and safe lighted environment while emphasizing restrictions, regulations and best practices for:

- Aircraft servicing and apron areas
- Aircraft support services, i.e., fueling, cargo, baggage load/unload
- Passenger loading and unloading
- Roadways
- Vehicle parking facilities
- Pedestrian walkways

The RP Encompasses the entire Airport Environment, both Airside and Landside.

2.0 Characteristics of Airport Areas

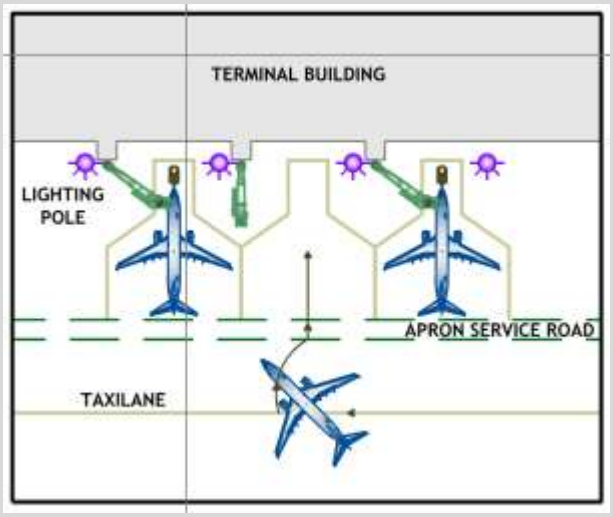
This section defines the activities and operations on the Airport:

- Aprons; Commercial (Air Carrier), Cargo, Hangar, General Aviation
  - Aircraft Stand
  - Aircraft parked position
  - Aircraft service area
- Other Airside Areas
  - De-icing Facilities
  - Fuel Facilities
  - GSE Storage Areas
  - Engine Run-up / Test Areas

2.0 Characteristics of Airport Areas

Aprons:

- General Layout shown
  - Parking aircraft
  - Aircraft support
  - Servicing
  - Loading / Unloading operations



2.0 Characteristics of Airport Areas

Aprons: Commercial (Air Carrier)

- Park aircraft
- Board & Deplane passengers
- Baggage, Fueling
- Aircraft servicing

2.0 Characteristics of Airport Areas

Aprons: Cargo Apron
- Parked cargo aircraft
- Load/Unload Cargo
- Fuel Aircraft

2.0 Characteristics of Airport Areas

Aprons: Hangar Apron
- Temporary parked aircraft
- Maintenance checks
- Can be a diverse Aircraft mix
- Various aircraft types

2.0 Characteristics of Airport Areas

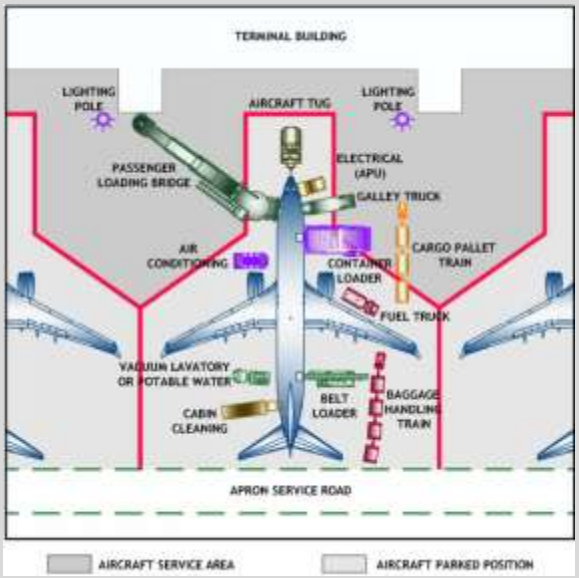
Within the Apron, is an Aircraft Stand:

Very Busy, Many functions

2.0 Characteristics of Airport Areas

Within the Apron, is an Aircraft Stand:

Very Busy, Many functions



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2.0 Characteristics of Airport Areas

This section defines the activities and operations on the Airport:

- Landside Areas
  - Departure / Arrival Areas
  - Walkways from Parking to Terminal
  - Roadway systems surrounding the Terminal
  - Directional signage
  - Secured access points
  - Surface parking and garage parking
- Tunnel lighting, under taxiways
- Laser sensitive areas

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3.0 Visual Issues

Visual issues will be unique to each airport based on operations and layout of the airport.

Visual issues include how lighting design for a task impacts other areas:

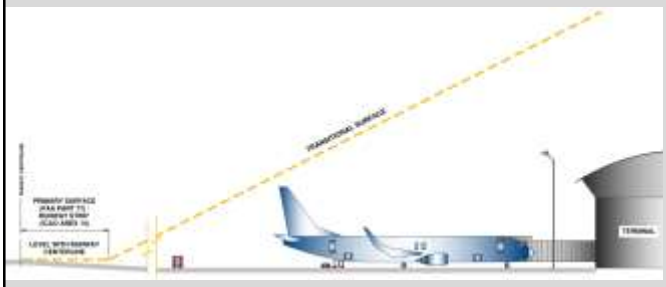
The designer must consider the effect of the lighting design on the:

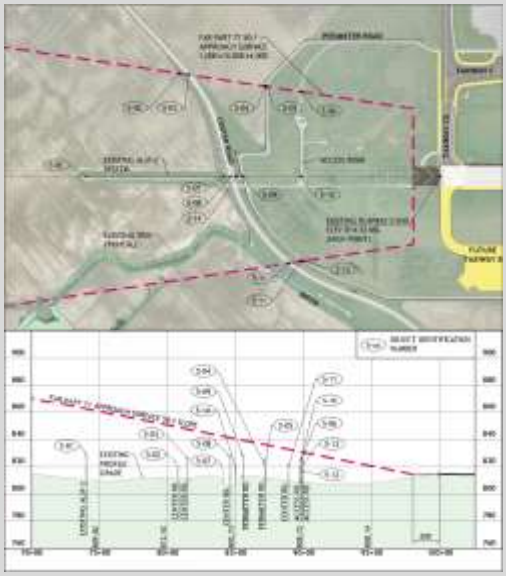
- Airport Geometry
- Control Tower
- Pilot
- Pedestrian and Driver Conflicts (landside)
- Security

3.0 Visual Issues

Visual issues for Airport Geometry:

- Approach Areas
- Height restrictions
- Part 77 surfaces

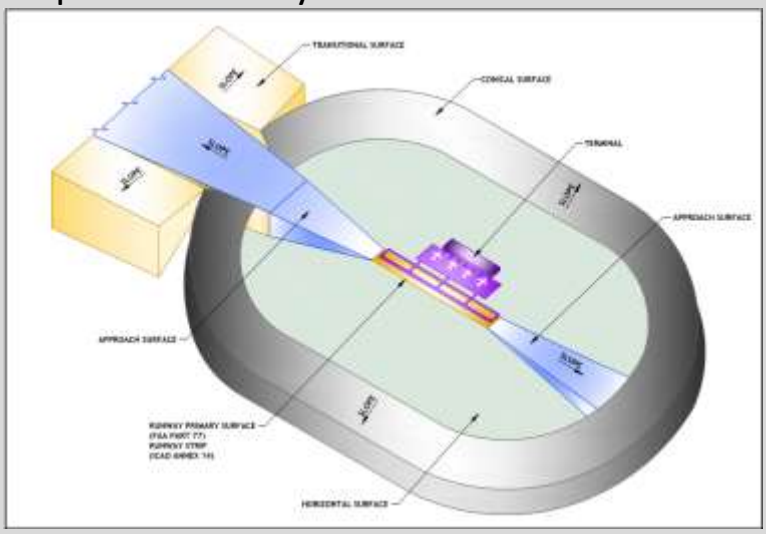




3.0 Visual Issues

Visual issues based on Airport Geometry:

- Imaginary Surfaces
- Approach Slopes



3.0 Visual Issues

Visual issues for Control Tower:

- Reflected light can be troublesome
- Controllers vision should not be impaired by glare or obtrusive light

3.0 Visual Issues

Visual issues for Pilot:

- Approaching Airport
- Rollout

3.0 Visual Issues

Visual issues for Pilot:

- Taxiing
- Parking the Aircraft

3.0 Visual Issues

Visual issues for Pedestrian and Driver Conflicts (landside):

- Magnitude of pedestrian flow is related to quantity of aircraft arrivals and departures
- Moving and stopped vehicles in the areas
- Distractions and unfamiliarity with services

3.0 Visual Issues

Visual issues for Pedestrian and Driver Conflicts (landside):

- This section adapted from ANSI/IES RP-8-14 American National Standard for Roadway Lighting
- All airport "Pedestrian Conflict Areas" are classified as "High"

3.0 Visual Issues

Visual issues for Security (both airside and landside):

- Maintain security of aircraft, aircraft perimeter
- Consider walkways and pathways
- Parking areas
- Keep line of sight open
- No hard corners/hiding places
- Tree canopies min. of 7ft above ground
- Softscape landscapes kept low
- Safety enhanced when people can see each other beyond 30 feet (fight or flee)

4.0 Design Criteria

This section contains design information for lighting the airport environment. Design Criteria is provided in Tabular form to be used with guidance provided.

- Codes, ordinances or mandates can supersede any of the IES criteria.
- This document does not supersede any government regulation, safety criteria or the Authority Having Jurisdiction
- Guidance Documents exist and designer should be familiar with:
  - FAA AC 150/5300-13 Airport Design
  - ICAO Aerodrome Manuals
  - European Standards
- Lighting design should avoid objectional spill light and glare

4.0 Design Criteria

Design Criteria Tables:

Table 1-Airside Areas

- Aprons
- De-Icing areas
- This document does not supersede any government regulation, safety criteria or the Authority

Recommended Light Levels (Horizontal, Vertical and Uniformity)

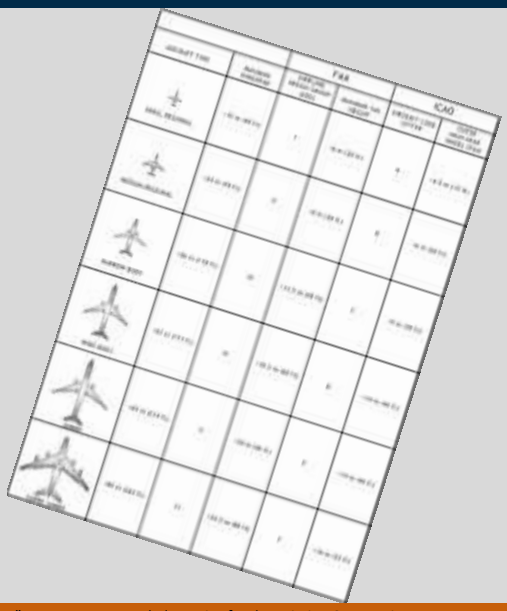
Lighting Locations and Tasks	Quantity		
	Horizontal Illuminance (Lux (fc) - average)	Vertical Illuminance (lux(fc) - average)	Uniformity ratio (average to minimum)
Aprons[a]: Commercial, General Aviation, Cargo, Hangar			
Aircraft Stand			
Aircraft Parked Position	20 lux (2 fc)	20 lux[*] (2 fc)	4:1
Aircraft Service Area	[c]	NA	5:1
Aircraft Stands Group I or Code A	20 lux (2 fc)	20 lux[*] (2 fc)	5:1
Cargo Facility Loading and Unloading	50 lux (5 fc)	50 lux[*] (5 fc)	4:1
Mechanical checks, Maintenance and Repair	20 lux (2 fc)	20 lux[*] (2 fc)	4:1
Fueling Operations	20 lux (2 fc)	20 lux[*] (2 fc)	4:1
Other Airside Areas[a]			
De-Icing Areas	Refer to **Table 3** in **Section 4.4**		
De-ice Storage Facility and Truck Loading			
Fuel Facilities			
Ground Service Equipment (GSE) Storage Areas	20 lux (2 fc)		4:1
Engine Run-up/Test Area (Hush House)	100 lux (10 fc)	100 lux (10 fc)	2:1

Notes for Table:
a - Refer to ANSI/IES RP-8-14 Section 5.13 Toll Plazas for more specific details.
b - Vertical Measurement at 6.6ft above the apron in the relevant direction (no uniformity ratio).
c - End user may require the use of supplemental lighting
d - Refer to Annex A, Table A.6
* - 50 percent of the average illuminance on the aircraft parked position

4.0 Design Criteria

Design Criteria:

Aircraft stands can accommodate multiple aircraft types, dimensional data and pilots eye position



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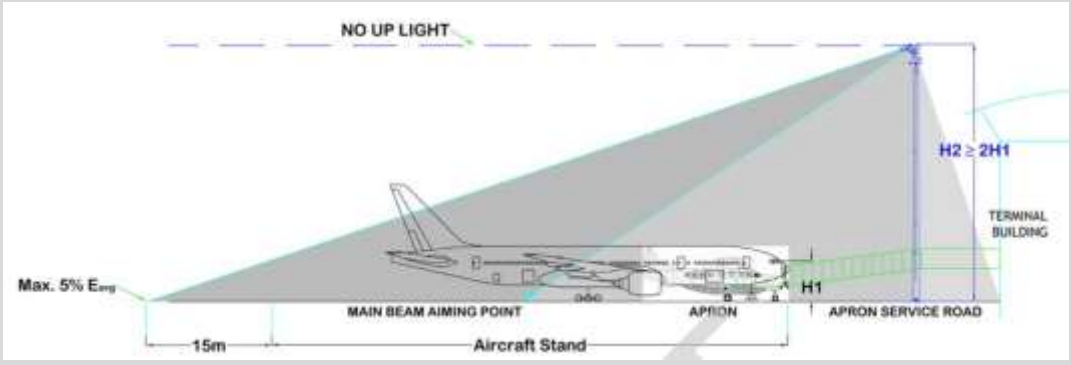
4.0 Design Criteria

Design of poles should minimize glare to pilot. Mounting height of luminaires should be at least 2X the pilots eye position height for largest design aircraft at the stand.



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4.0 Design Criteria

Design:

- Provide light directed to aircraft stand from two or more directions
- Shadows on the apron can impact efficiencies, goal is to minimize shadows
- Shadows are created when light poles are omitted between aircraft

4.0 Design Criteria

Good lighting design:

- Provides uniform lighting on apron
- Decreases shadow on apron
- Minimizes pilot glare
- Light is cutoff outside the area to be illuminated

4.0 Design Criteria

Fueling areas:

- Provides increased lighting for loading areas
- Minimizes glare
- Light is cutoff outside the area to be illuminated

4.0 Design Criteria

De-icing areas can be located at locations where poles cannot be installed, use of equipment mounted lights may be required.

Coordinate deicing operations:

- Surface height restrictions
- Approach aircraft
- Glare from deice operations

4.0 Design Criteria

Design Criteria Tables:

Table 1- Landside Areas

- Departures/arrivals
- Road systems
- Parking
- Landscaped areas
- Vechicle tolls

Recommended Light Levels (Horizontal, Vertical and Uniformity)

Lighting Locations and Tasks	Quantity		
	Horizontal illuminance (Lux (fc) - average)	Vertical illuminance (lux(fx) - average)	Uniformity ratio (average to minimum)
Landside Areas			
Departure, Arrival Areas	Refer to **Section 4.5** and **Annex A**		
Walkways from Parking Facility to Terminal			
Surrounding Road Systems			
Secure Acess Point	Refer to **Table 4** and **Section 4.5.5**		
Parking (Exterior Only)			
Top level R1[d]	15 lux (1.5 fc)	10 lux (1 fc)	4:1
Top level R4[d]	10 lux (1 fc)	6 lux (.6 fc)	4:1
Pedestrian transaction area	20 lux (2 fc)	10 lux (1 fc)	4:1
Vehicle Transaction Area[a]	50 lux (5 fc)	NA	4:1
Parking lots - R4	10 lux (1 fc)	6 lux (.6 fc)	4:1
Other Exterior Lighting			
Landscaping, façade illumination, etc.	Refer to IES Lighting Handbook, 10th Edition and IES RP-33-14		

Notes for Table:
a - Refer to ANSI/IES RP-8-14 Sectoin 5.13 Toll Plazas for more specific details.
b - Vertical Measurement at 6.6ft above the apron in the relevant direction (no uniformity ratio).
c - End user may require the use of supplemental lighting
d - Refer to Annex A, Table A.6
* - 50 percent of the average illuminance on the aircraft parked position

4.0 Design Criteria

Design Criteria:

Landside Areas

- Walkways to/from parking and rental cars
- Illuminate area at least 30 feet around the walkway for security and visual recognition

4.0 Design Criteria

Design Criteria:

Roadside / Pedestrian Areas

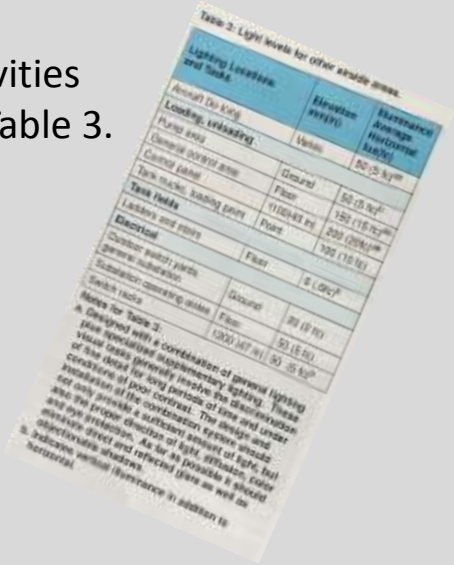
- Conflict areas to be well illuminated
- Provide luminance of pedestrians for vehicle drivers to visually acquire
- Avoid lights only at cross walks

4.0 Design Criteria

Design Criteria Tables:

Other Airside Areas, Industrial areas / Activities on and around an airport are provided in Table 3.

- De-icing vehicle loading areas
- Loading and unloading of fuels and liquids
- Fuel tank fields
- Outdoor electrical equipment



5.0 Essential Safety and Security Lighting

This section contains information for safety and security lighting for public egress and safety. Guidance is given for:

- Exit Lighting – To Apron Area from the Building
- Coordinate with the facilities back-up power system:
  - Design duration of power outage
  - Available power capacity of the standby systems
  - Restrike time of HID lamps
  - Review with AHJ

6.0 Environmental Conditions

This section contains guidance for lighting design with respect for the environment, neighbors and future generations.

- Light Pollution and Light Trespass
- Boundary Limit Concepts
- Lighting Ordinances
- Outdoor Site-Lighting Performance (OSP)
- Leadership in Energy and Environmental Design (LEED)
- Ecological Aspects
- Sustainable Development

Annex A through I

Annex information is provided from other documents to provide lighting criteria and information:

- Values for Roadways, pedestrian areas
- Field Measurements and performance criteria
- Maintenance Considerations
- Lighting Equipment
- Economic Considerations
- Aviation Glossary
- References
- Suggested Reading
- Lighting Terms

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Questions or Comments?

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IESALC recommended practices subcommittee

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