NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

May 1, 2018

Airports Specialist Report

AIRPORTS

DCA17IA148

A. ACCIDENT

Operator	:	Air Canada
Airplane	:	Airbus A-320-211 [C-FKCK]
Location	:	San Francisco, CA
Date	:	July 7, 2017
Time	:	~ 2356 Pacific daylight time (PDT)[1]
NTSB #	:	DCA17IA148

B. AIRPORTS

Specialist	:	Peter Wentz National Transportation Safety Board Washington, DC

C. SUMMARY

On July 7, 2017, about 2356 Pacific daylight time, Air Canada flight 759 (ACA759), an Airbus A320, Canadian registration C-FKCK, was cleared to land on runway 28R at San Francisco International Airport, San Francisco, California, but instead lined up on parallel taxiway C, where four air carrier airplanes (a Boeing 787 followed by an Airbus A340, another Boeing 787, and a Boeing 737) were awaiting takeoff clearance. ACA759 overflew the first airplane on the taxiway and descended below 100 ft above the ground, and the ACA759 flight crew initiated a go around. The flight was operated under the provisions of 14 *Code of Federal Regulations* Part 129 as an international scheduled passenger flight from Toronto/Lester B. Pearson International Airport, Toronto, Canada, with 135 passengers and 5 crewmembers on board. Night visual meteorological conditions prevailed at the time of the incident. The airplane was not damaged, and no injuries were reported.

D. DETAILS OF THE INVESTIGATION

1.0 Airport

San Francisco International Airport (SFO) was located 8 miles southeast of San Francisco and was owned and operated by the City and County of San Francisco. The airport (figure 1) was certificated under Title 14 Code of Federal Regulations (CFR) Part 139 with Index E aircraft rescue and firefighting (ARFF) capabilities.[2] SFO had two sets of parallel runways, the parallel runway being utilized for approaches on July 7, 2017 were 10R/28L and 10L/28R[3]. Runway 28L was separated by 749 feet from the centerline of runway 28R which separated by 490 feet[4] from the centerline of taxiway C.

[1] All times in this report are Pacific daylight time, based on a 24-hour clock.
[2] SFO was certified as an Index E airport based on five or more average daily departures of aircraft at least 200 ft in length, as defined in 14 CFR 139.315.
[3] For clarification in this report runway 10R/28L will be referred to as 28L and 10L/28R will be referred to as 28R.
[4] Separation lengths were taken from google earth and are approximate.

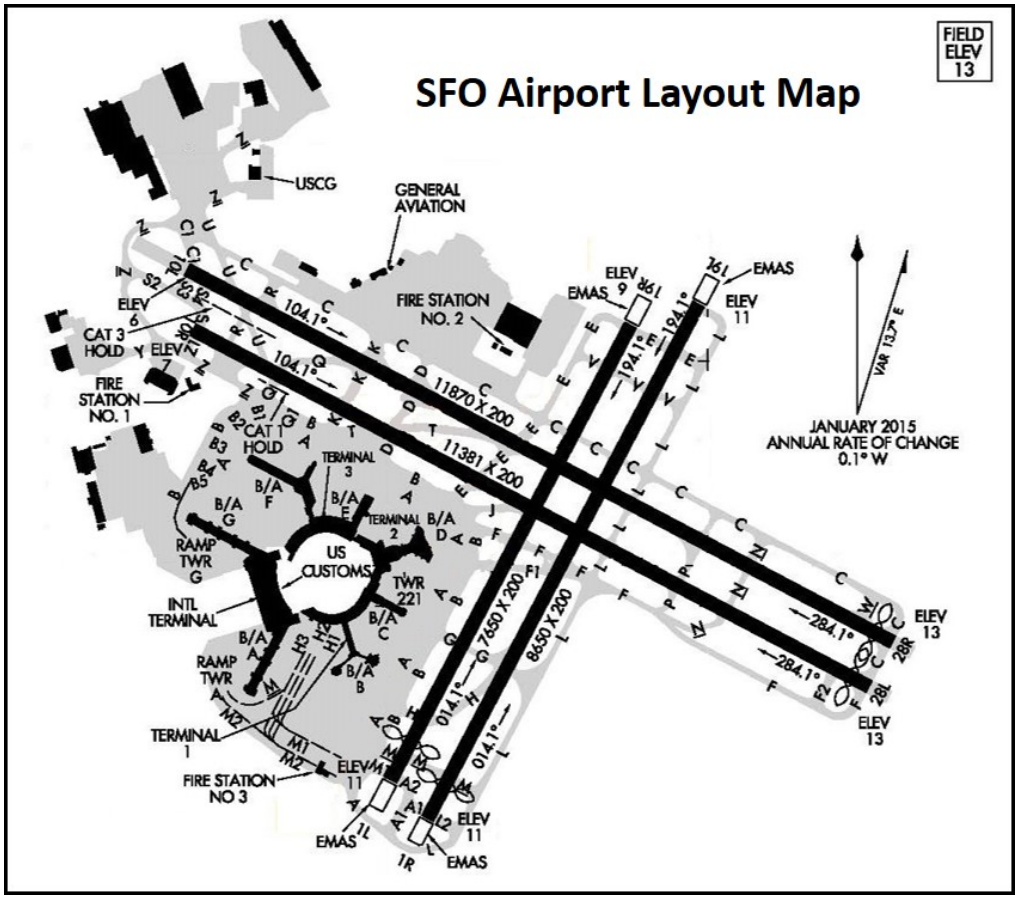


Figure 1 – SFO Airport layout map.

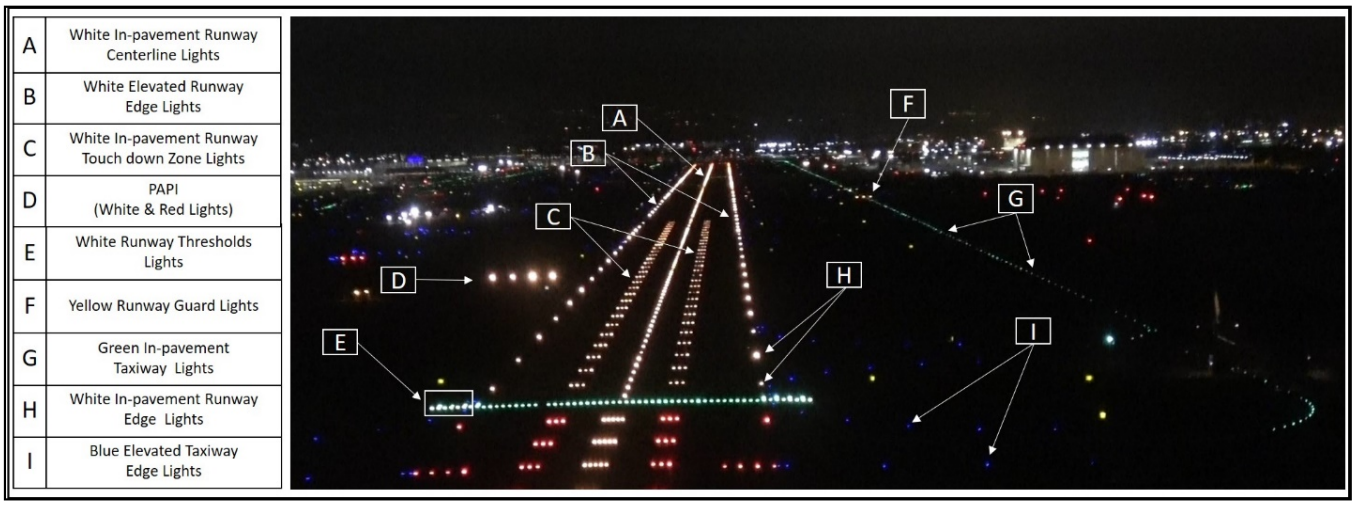
1.1 Airport Inspections

SFO airport inspections for runway, taxiway, airport signage and lighting were conducted on February 7-8, 2017. The date, type of inspection, task, remarks and time performed are located on the inspection log (attachment 1). Once the airport inspector finishes the inspection, if no discrepancies were found, they change the status to "Complete" and electronically sign the log. If discrepancies were found, the inspector would note the discrepancy in the remarks column and electronically sign the log. On July 7th, runway 28R was inspected at 1550, runway 28L was inspected at 1609, all taxiways were inspected at 2108. On July 8th airport signage was inspected at 0211 and airport lighting was inspected at 0339. No discrepancies were noted in the remarks column.

2.0 Runways 28R and 28L

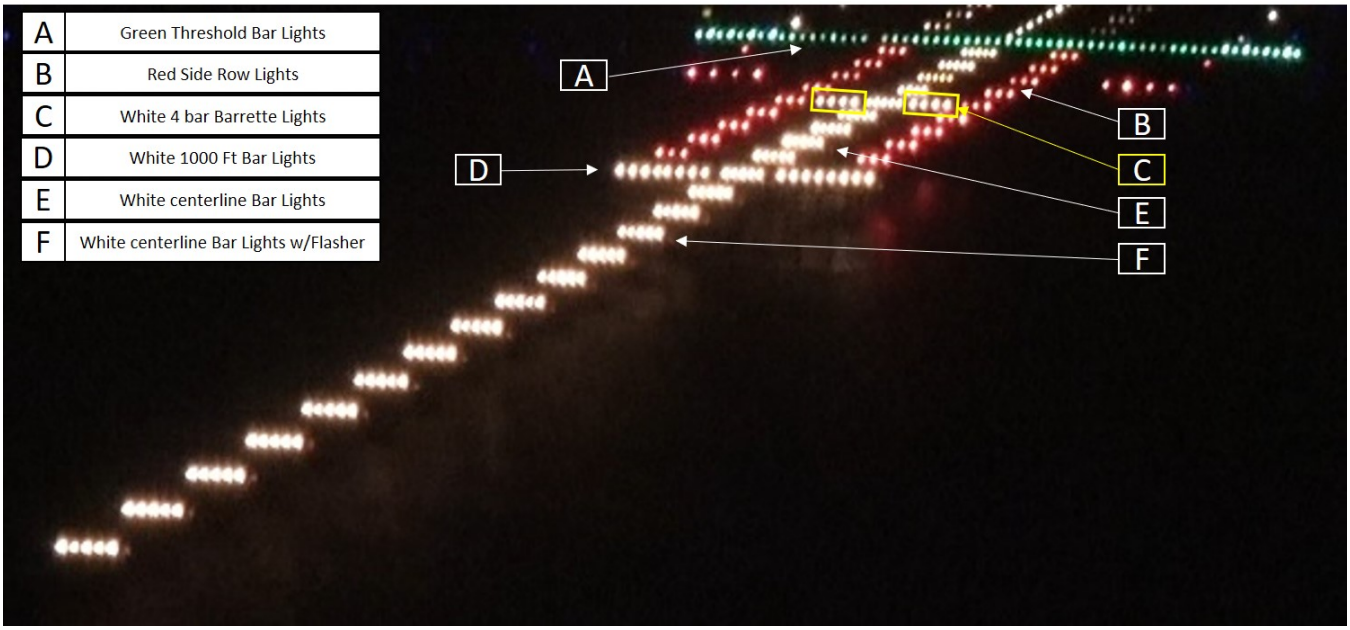
2.1 Runway 28R

Runway 28R was 11,870 feet long by 200 feet wide and was open at the time of the flyover. Photograph 1 illustrates the color and style of lights found on runway 28R and taxiway C and on at the time of the event.



Photograph 1[5] – SFO airport lighting on runway 28R and taxiway C.

Additionally, runway 28R was equipped with a high intensity approach lighting system with sequenced flashers, category II (ALSF-2[6]) Photograph 2 illustrates the color and style of lights found on the ALSF-2 system. The ALSF-2 was on at the time of the event according to the air traffic controller on duty[7] except for the strobe in the white centerline bar lights (F).



Photograph 2 – SFO ALSF-2 lightning system on runway 28R.

[5] Photographs 1 and 2 are still images taken from a video of runway 28R recorded after the flyover event.
[6] An approach lighting system provides a ground reference aid for the pilot when making an approach to the runway, including lateral guidance or alignment to the runway, horizontal banking position of the aircraft with respect to the ground, impending touchdown position of the aircraft, and the threshold of the runway.
[7] Air Traffic Control Factual Report-Attachments 1 – Interviews page 9.

Figure 2 illustrates the ALSF-2 system that was installed on runway 28R at SFO. The ALSF-2 extended into the bay with the lights facing in the direction of the approaching aircraft. The ALSF-2 consisted of steady burning lights, including green threshold lights, red side row lights, and high intensity white centerline lights, additional the last (furthest) 15 centerline bar lights have flashing strobes that were not on at the time of the flyover. The lights were spaced at 100-foot intervals from the runway threshold outward to 2,400 feet.

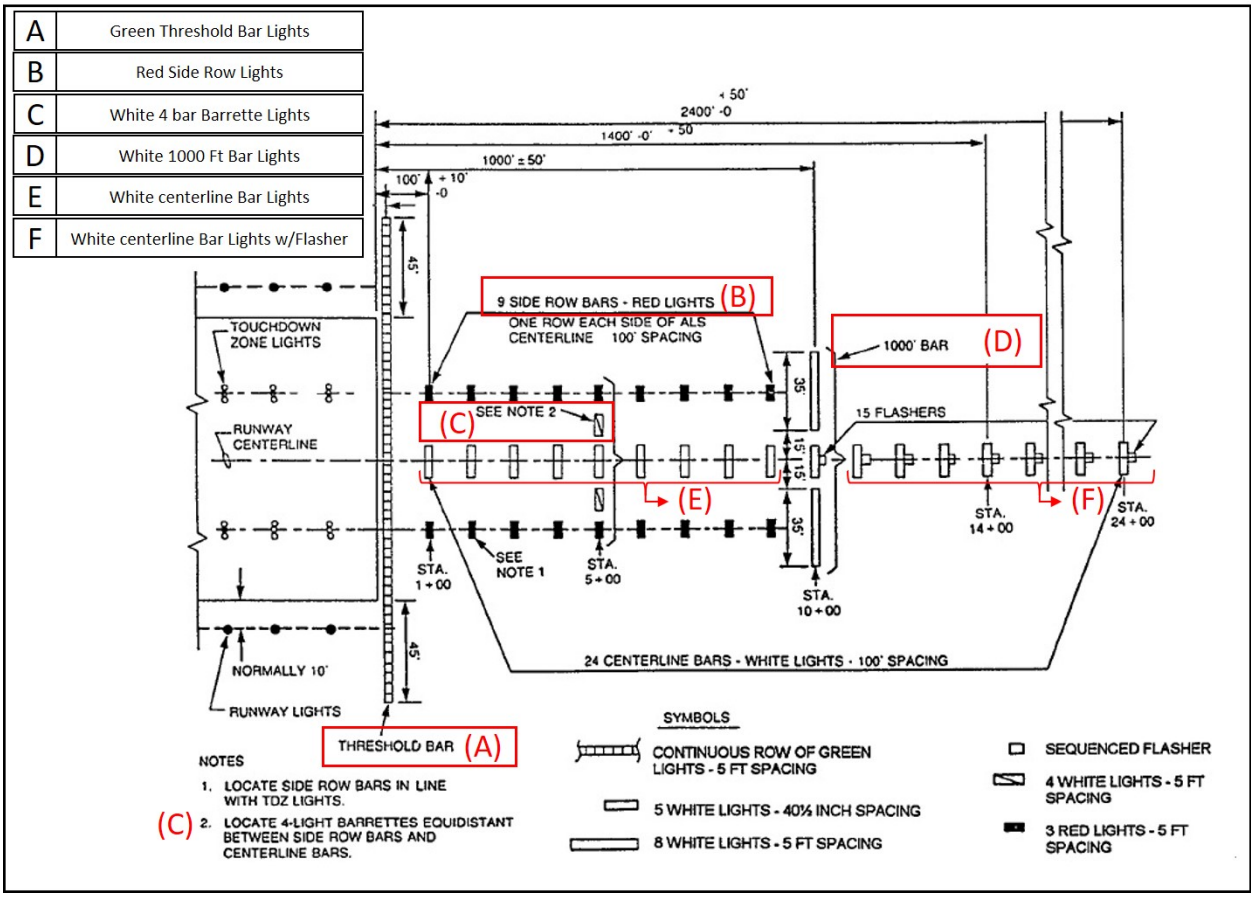


Figure 2 - ALSF-2 Configuration at SFO.

2.2 Runway 28L

Runway 28L was 11,381 feet long by 200 feet wide. The runway was closed at 2311[8] on the night of the flyover, its runway and approach lighting systems off, and a runway closure marker[9] (RCM) was in place at the threshold (see section 5.0). NOTAM 07/26[10] was in effect at the time of the flyover:

[8] Airfield lighting logs provided by SFO Head Airport Electrician. Log times are recorded in Pacific standard time (PST) (attachment 2).

[9] FAA AC-150/5370-2G (2.18.3.2) Temporarily Closed Runways stated, "If available, use a lighted X, both at night and during the day, placed at each end of the runway on or near the runway designation numbers facing the approach."

[10] NTSB Operational Factors/Human Performance group factual report – Attachment 7 – FAA NOTAM's for SFO.

3.0 Taxiway C

Taxiway C at SFO was 12,330 feet long by 75 feet wide and was oriented on the northeast side of runway 28R. Figure 3 shows the location of taxiway C to runway 28R.

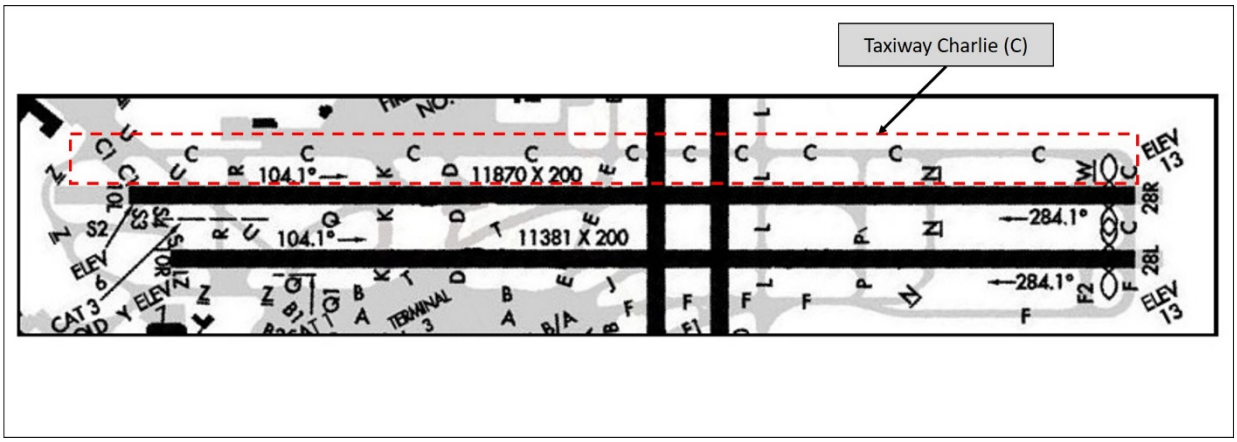
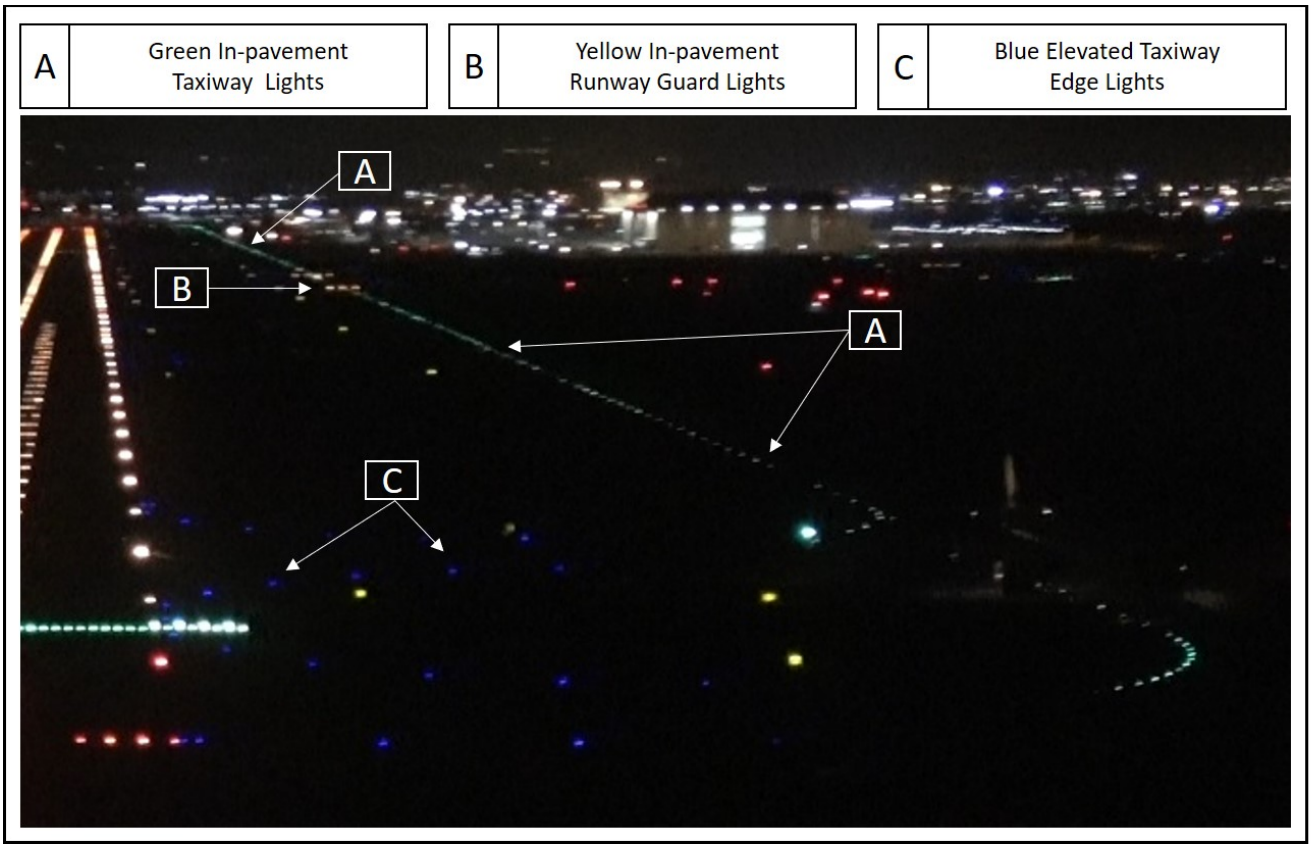


Figure 3 – Taxiway C.

Photograph 3 illustrates the color and style of lights on taxiway C and illuminated at the time of the event. The taxiway was configured with in-pavement green centerline[11] lights distributed every 50 feet (+/- 5 feet). Blue elevated taxiway lights were located at each intersection nearest runway 28R to highlight the edge of the intersection. In-pavement yellow guard lights were located where taxiway C intersects runway 1R/19L.

[11] Title 14 CFR 139.311- Marking, signs, and lighting – (c) Lighting (2) One of the following taxiway lighting systems: (iii) Centerline lights.



Photograph 3 – SFO taxiway C lighting.

4.0 Taxiway Lighting Regulations and Configurations

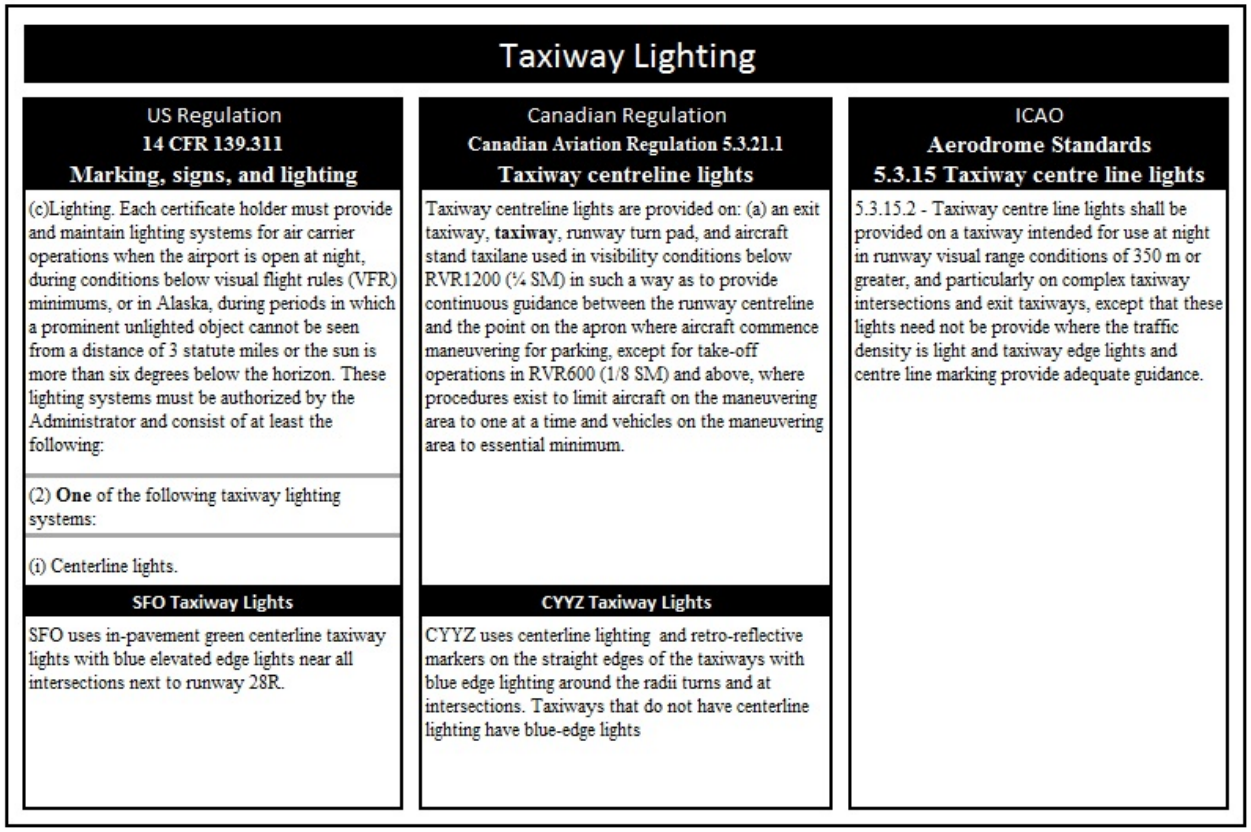


Figure 4 – Taxiway lighting regulations and configurations for SFO and CYYZ.

5.0 Airport Construction

Runway 28L was undergoing a resurfacing construction project (photograph 4) with lighting improvements at the time of the event. The purpose of the project was to rehabilitate runway 28L and to replace existing light fixtures. Additional lighting improvements included new runway to taxiway lead on/off lights, new takeoff-hold lights, and new runway entrance lights. The work required the closure of runway 28L on a nightly basis with 7 weekend closures. The project started on February 21, 2017 with an expected duration of 300 days. On the night of the flyover, runway 28L was closed and workers were actively on site at the intersection of 28L and taxiway F (figure 4). Twenty-eight portable light plants[12] (photograph 5) had been placed around the construction zone to provide nighttime visibility for the construction workers.[13]

[12] The construction area was lit with 28 Wacker Neuson LTN6, Doosan LSC, or Allmand Bros Night Light Pro light plants. Each extended up to 30 feet and consisted of 4 elliptical light fixtures with 1000W (4000W total) metal halide light bulbs in each elliptical light fixture.

[13] FAA AC 150/5370-10G states in section 403-4.14(c) Nighttime Paving Requirements "the contractor shall furnish and use, complete artificial lighting units with a minimum capacity of 3,000 watt electric beam lights, affixed to all equipment in such a way to direct illumination on the area under construction.

Photograph 4 – Construction Zone on runway 28L.

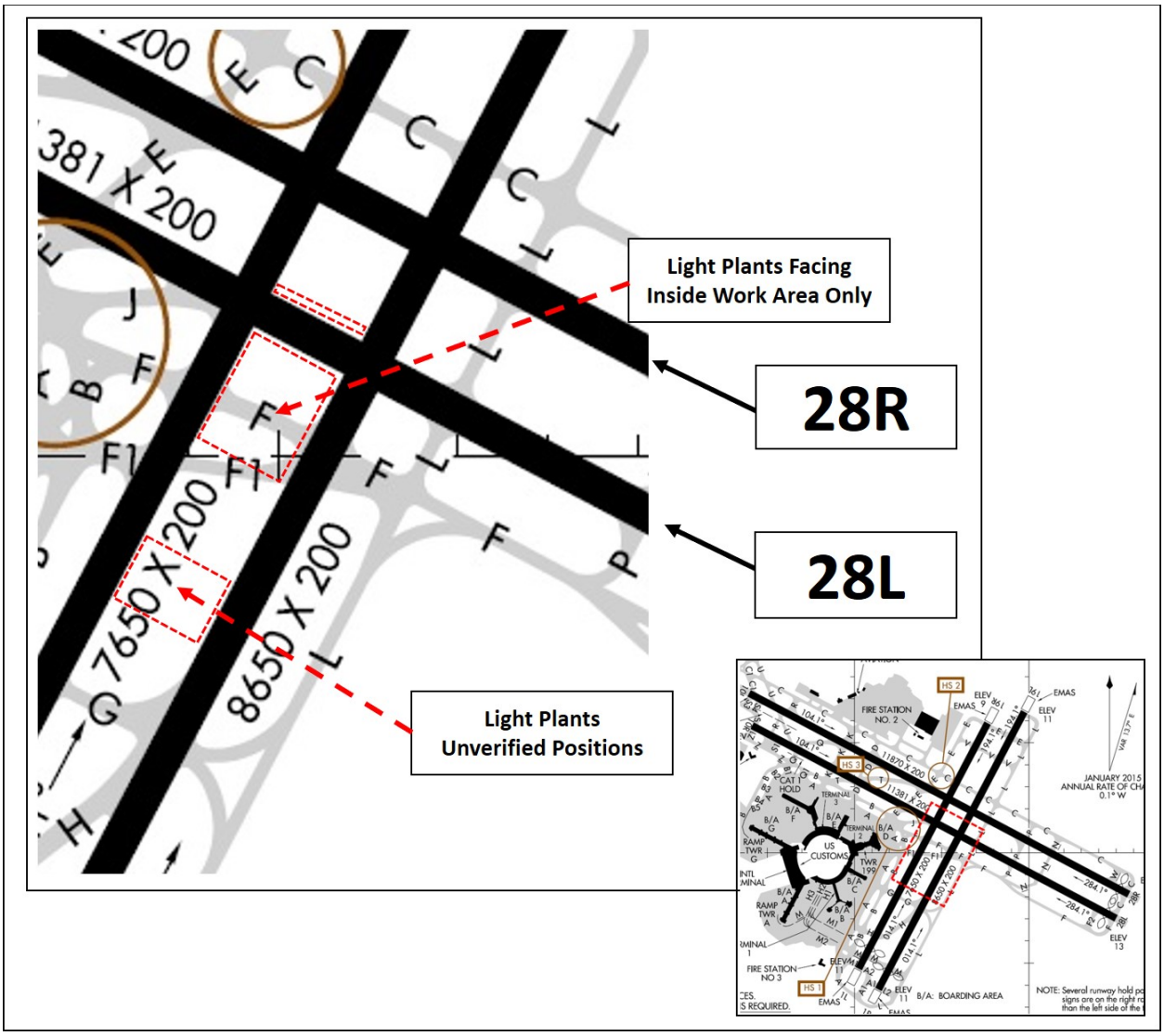


Figure 4 – SFO runway 28L construction zone.[14]

[14] RCM and light plant positions verified by SFO airfield operations assistant manager.

Photograph 5 – Exemplar construction light plant.

6.0 Runway Closure Marker

Runway 28L was marked closed with a RCM located at the runway designation numbers of runway 28L. The RCM was a model S1701W manufactured by Sherwin Industries Inc. When opened, the lighted "X" spanned 20'6" and had a flash rate of 2.5 seconds on and 2.5 seconds off.

7.0 Notice To Airmen (NOTAM)[15]

FAA AC 150/5370-2G Operational Safety on Airports During Construction, section 2.13 Notification of Construction Activities stated:

"Only the airport operator may initiate or cancel NOTAMs on airport conditions, and is the only entity that can close or open a runway. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center), and must either enter the NOTAM into NOTAM Manager[16], or provide information on closed or hazardous conditions on airport movement areas to the FAA Flight Service Station (FSS) so it can issue a NOTAM. …"

FAA AC 150/5200-28F Notices to Airmen (NOTAMs) for Airport Operators, discusses the responsibility of the airport operator in section 1.6. This section outlines procedures for making

[15] Referenced in the Operational Factors/Human Performance group report – Attachment 7 – FAA NOTAM's for SFO for all NOTAMs current at the time of the flyover.
[16] NOTAM manager is an FAA developed web-based application to deliver NOTAM submissions faster, create content that is easier to read, filter, search and allow users to receive NOTAMs on multiple data devices.

known any condition that would present a hazard during the arrival or departure of aircraft. For example, it says the airport should coordinate the issuance/cancellation of NOTAMs with the air traffic facilities. It also states the airport should ensure notifications are made in a timely manner and acknowledges that the airport has responsibility for facility components such as pavements, runway lights, and airport guidance sign systems.

E. LIST OF ATTACHMENTS

Attachment 1: SFO Airport Inspection Logs
Attachment 2: SFO Airport Lighting Logs

Peter Wentz
Airport Specialist