RUNWAY INCURSION PREVENTION PROGRAM

ICAO NAM/CAR/SAM RUNWAY SAFETY/INCURSION CONFERENCE

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1. INTRODUCTION

In dealing with Runway Incursion avoidance, the following questions must be considered:

- Are the airport signage, lighting, and markings adequate or would they be a contributing factor for a runway incursion?

- What are the lighting, visibility and weather conditions?

- Are you familiar with the airport layout?

- Are there language problems that may contribute to a runway incursion?

- What is your experience in operations at high-density traffic airports?

- What do you believe may cause a runway incursion?

- What do you think may help to prevent a runway incursion from happening?

Knowing the answers to these questions helps raise the awareness of the factors that may lead to a Runway Incursion event, and thus help prevent such occurrences.

2. BACKGROUND

In recent years, the number of runway incursions has increased significantly worldwide. Runway safety is a complex and urgent issue in light of the forecasted 35 % increase in commercial aviation operations, and 21 % growth in general aviation operations over the next decade.

Runway incursion is a "Hot Topic". It is the US Federal Aviation Administration's (FAA) number one safety concern and a top priority. The National Transportation Safety Board (NTSB) has placed runway incursions on their "Most Wanted Transportation Safety Improvement" list.

The International Civil Aviation Organization (ICAO) also noted that greater attention by States in the CAR/SAM Region is required to address the problem and its impact on operational safety.

In Europe, an Eurocontrol task force has initiated a survey on runway safety in response to tripartite contact between the FAA, Joint Aviation Authority (JAA) and Eurocontrol.

In IATA, Runway incursion is considered a significant safety factor and is a CAR/SAM regional safety priority.

The industry has identified as a high priority the implementation of several initiatives aimed at reducing or eliminating accidents or incidents attributable to runway incursions.

They include efforts that address pilot familiarity with airports, navigation and communications improvements, pilot/controller memory and attention, controller skill development, compliance with regulations by pilots and controllers, and improved dissemination of safety/security-related information.

The aeronautical community emphasizes the need for better education, training awareness, and procedures. It also notes the importance of new technologies available to help prevent runway incursions.

3. CONCEPT

A runway incursion is defined as "any occurrence at an airport involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in loss of separation with an aircraft taking off, intending to take off, landing, or intending to land."

Runway incursions are grouped into four categories:

- Pilot Deviations,
- Operational Errors,
- Operational Deviations, and
- Vehicle or Pedestrian Deviations.

Pilot deviations are the leading category of runway incursions, increasing throughout the 1990s. An analysis of runway incursion data indicates runway incursions most likely to cause accidents generally occur at complex, high volume/density airports. The data also show there is a high incidence of runway incursions involving general aviation pilots that often result from misunderstood controller instructions, confusion, disorientation, and/or inattention.

Because runway incursions can involve and affect such a wide cross section of pilot skill levels and airport operations, runway incursion prevention measures must be as broad in scope as possible.

4. TARGET

The goal is to reduce runway incursions in the CAR/SAM Region. In order to achieve this goal, programs are being designed to reduce pilot deviations through enhanced education and training of crewmembers, and to gather and evaluate more data on the causes of runway incursions. To help meet this target a Runway Incursion Prevention Program in Latin America and the Caribbean was launched in May 2001.

5. PROGRAM

Standardized training is essential to the reduction of runway incursions. Flight training and evaluation is normally concentrated on the take off and departure procedures, enroute navigation and the approach and landing. Very little training or guidance has been provided for surface operations.

It was found that there is a definite need for training and evaluation, from the time that aircraft starts to move until it is parked at the gate or ramp.

This motivated the FAA and IATA Latam/Car Regional Operations & Infrastructure Office, to create a task force to develop a Runway Safety Education and Training Aid, as part of the IATA Regional Flight Safety Program. The final version of the CD-ROM based Training Aid is almost complete and could be disseminated in the region by the Pan-American Aviation Safety Team (PAAST).

This Training Aid is designed to raise the awareness of pilots to airfield safety concerns. The emphasis is on the importance of adhering to safe operating procedures at all times while taxiing an airplane on any airport operations area, regardless of the type of airplane, the understanding of the roles and responsibilities of pilots and controllers, and the causes and prevention of runway incursions.

6. TASKS

- Develop training module to address core issues relative to runway incursions.
- Disseminate training module.
- Feedback gathering and analysis.

7. OBJECTIVES

- Provide an educational resource.
- Provide a guide for training and practice.
- Provide a baseline-training program for operators.
- Provide a baseline to evaluate runway safety practices and procedures.

8. PARTICIPATING ORGANIZATIONS

- Federal Aviation Administration (FAA): National Runway Safety Program.
- IATA Regional Operations and Infrastructure Office, Latin America/Caribbean.
- Pan American Aviation Safety Team (PAAST).

9. TIMEFRAME

- Immediate:
    - Dissemination of training module by PAAST Action Team Leaders in the CAR/SAM Region.
    - Feedback from PAAST Action Team Leaders to IATA ROI.
    - Feedback from IATA ROI to FAA., PAAST, and ICAO.
    - Analyze data, and draw conclusions.
    - Identify other possible interventions.

10. CONCLUSION

The Runway Safety Education and Training Aid is intended to provide a standardized safety program from "Gate to Gate" for air carriers. Action to distribute the training aid will raise the awareness of pilots and controllers and thus reduce occurrence of Runway Incursion events.

APPENDIX A

1. **CONTENTS OF RUNWAY SAFETY EDUCATION TRAINING AID (CD-ROM)**

- Part 1: Introduction

- Part 2: Runway Incursions
    - Runway Incursion Classification
    - Runway Incursion Severity
    - Runway Safety Program
    - Runway Incursion Evaluation Program
    - English Language Requirement

- Part 3: Airfield Signage, Marking and Lighting
    - Airfield Signs
    - Airfield Markings
    - Airfield Lighting

- Part 4: Technological Solutions
    - Programs to reduce Runway Incursion
    - ATIDS
    - ASDE
    - ADS-B
    - NASA TAP
    - AMASS

- Part 5: Flight Crew
    - Recommended Procedures

- Part 6: Summary

Note: Speaker notes are available in several slides.

APPENDIX B

1. TASK FORCE MEMBERS

- Al Castan, IATA Director Operations & Infrastructure, Latin America/Caribbean
- Celio Young, Sr. Technical Analyst, FAA Consultant
- Mike Casey, FAA Safety Program Manager
- Bob Hall, FAA Principal Operations Inspector (IFO)
- Don Boek, FAA Principal Operations Inspector (IFO)
- Julio Lopez, IATA Manager O&I, Latin America/Caribbean
- Eduardo Chacin, IATA Manager O&I, Latin America/Caribbean

APPENDIX C

1. QUESTIONS QUIZ

1. The color scheme for signs identifying what Taxiway you are on is
   A) Black inscription on yellow background.
   B) Yellow inscription on black background.
   C) White inscription on black background.

2. Clearance is needed from the air traffic controller in order to drive on the Ramp area.
   A) True.
   B) False.

3. Perimeter roads provide access from one area of the airfield to another without traveling on runways or taxiways.
   A) True.
   B) False.

4. A steady red ATC light gun signal indicate you must
   A) Move into the Runway Safety Area for protection.
   B) Stop.
   C) Wave your hands so that the controller can see you.
   D) Stop at the next intersection.

5. Taxiway can be identified by
   A) Letters.
   B) Numbers.
   C) Combination of letters and numbers.

6. A red sign with white lettering is a mandatory instruction sign – do not proceed past one of these signs without explicit clearance from ATC, at controlled airports. At non-controlled airports, use extreme caution.
   A) True.
   B) False.

7. Runway pavement markings are
   A) Blue in color.
   B) Yellow in color.
   C) White in color.

8. Runway edge lights are white in color but change to yellow for the last 2,000 feet on an instrument runway.
   A) True.
   B) False.

9. Taxiways are used by aircraft/vehicles to get to and from the ramp/apron and the runway.
   A) True.
   B) False.

10. Non-Movement areas are
    A) Parking areas.
    B) Loading areas.
    C) Maintenance ramps.
    D) All of the above.

11. What does figure 6 signify?
    A) Aircraft/Vehicle is on runway 4.
    B) Approaching runway 4.
    C) Runway distance remaining identifies runway length remaining in 1000'
       increments.

12. Movement area consists of taxiways, runways, and other designated areas as determined by each airport.
    A) True.
    B) False.

13. What does figure 20 indicate?
    A) Hold position pavement marking (hold short of intersecting runway, also land and hold short marking).
    B) Hold short of ILS critical area (do not cross without ATC permission).
    C) Movement area boundary.

14. If I had to cross the runway, I should try to do so
    A) Wherever I want.
    B) At approach end of active runway.
    C) On the left-hand side from stub-taxiway.

15. What color is the taxiway edge lights/reflectors?
    A) Blue.
    B) Red.
    C) White.

16. A controller who says "go ahead" means
    A) Proceed as requested.
    B) Continue straight ahead.
    C) State your request.

17. Vehicles on the airport operations area
    A) Do not always have to yield to aircraft.
    B) Should not yield to aircraft.
    C) Always have to yield to aircraft.

18. Figure 23 illustrates
    A) Taxiway edge line.
    B) Movement area boundary (defines boundary of movement area and non-movement area.
    C) All of the above.

19. If you are in doubt of controller instructions, you should
    A) Ask the controller to "Say Again."

B) Proceed anyway.
C) Both are correct.
D) None of the above.

20. What does the Aviation Phraseology denote?

A) Acknowledge –	I) Negative –
B) Advise intentions –	J) Proceed –
C) Affirmative –	K) Read back –
D) Confirm –	L) Say again –
E) Correction –	M) Standby –
F) Go ahead –	N) Unable –
G) Hold –	O) Verify –
H) Hold short of –	

21. Do you need permission from ATC to enter into the Non-movement area?
    A) Yes.
    B) No.

22. Runway Incursion - is any occurrence at an airport involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of separation with an aircraft that is taking off, intending to take off, landing, or intending to land.
    A) True.
    B) False.

23. What colors are mandatory instruction signs?
    A) Red, White and Blue.
    B) Red and White.
    C) Yellow and Black.

24. All Taxiway location signs have an arrow on them.
    A) True.
    B) False.

25. Aircraft can use vehicle service lanes at any time.
    A) True.
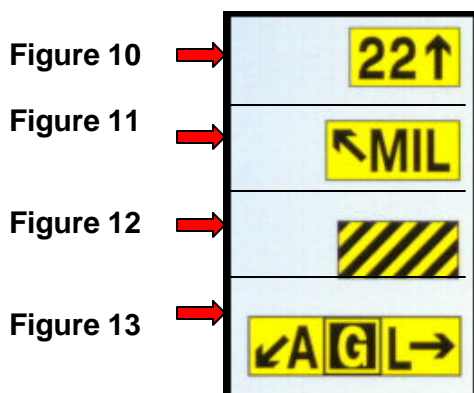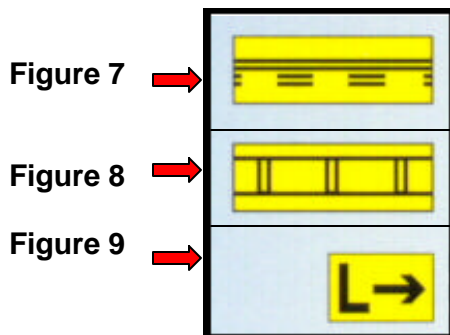   B) False.

26. Taxiway ending marker looks like
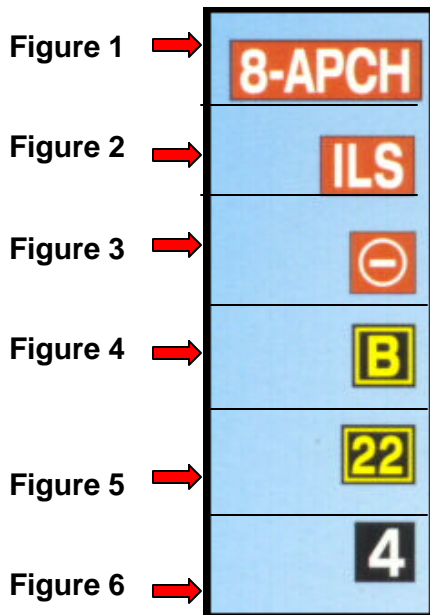   A) Figure 12
    B) Figure 8
    C) Figure 1
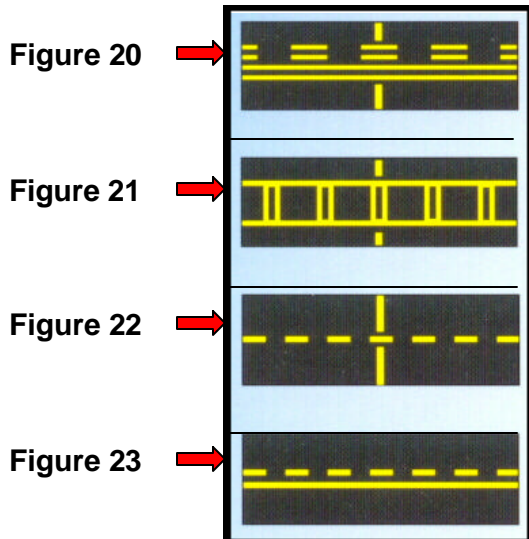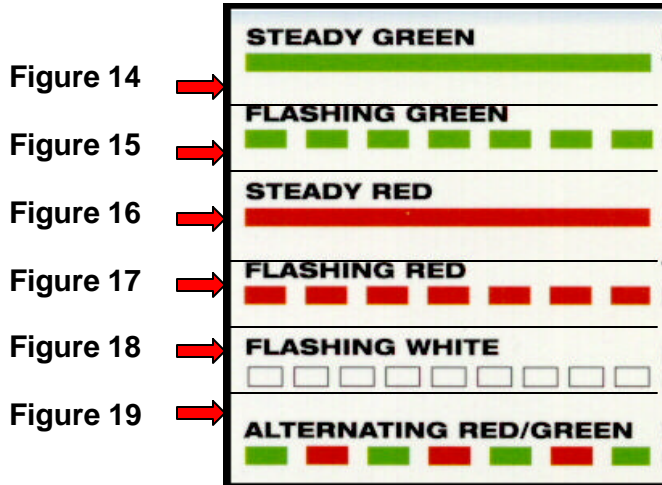
27. Foreign Object Debris (FOD) is any debris on the airfield that can cause damage to an aircraft.

    A) True.
    B) False.

28. A Taxiway/Taxiway Holding Position marking is
    A) Double dash/double solid yellow lines
    B) Single solid/single dash lines.
    C) Single dash line.
    D) None of the above.

29. Runway Guard Lights (wig-wag) are
    A) Flashing blue In-pavement and/or Elevated lights.
    B) Flashing white In-pavement and/or Elevated lights.
    C) Flashing amber In-pavement and/or Elevated lights.

30. Before entering a movement area you must have
    A) An Aviation two-way radio with the airport's ground control and tower frequencies on it.
    B) An escort vehicle with an aviation two-way radio.
    C) Both correct.
    D) None of the above.

31. Aircraft are permitted to cross a double dash yellow taxiway edge marking.
    A) True.
    B) False.

32. How would you know a runway is closed?
    A) With a yellow "X" on the runway.
    B) NOTAM closed.
    C) Check the ATIS frequency.
    D) All of the above.

33. Surface painted taxiway direction/location signs are painted
    A) Where it is not possible to install vertical taxiway direction/location signs.
    B) To look good.
    C) To enhance low visibility conditions.
    D) Both A and C are correct.

34. A white zippered roadway edge stripes depicts
    A) Vehicle roadway marking.
    B) New standards for runway markings
    C) Aircraft parking area.

35. An airport surface marking that has a large white letter "H" on a light gray background identifies
    A) Taxiway "H" for Hotel.
    B) Hospital Emergency.
    C) Helicopter landing pad.
    D) All of the above.

36. What is the color of taxiway centerline lights/reflectors?
    A) Green.

B) Blue.
C) Combination of green and blue.
D) None of the above is correct.

37. What ATCT light gun signal signifies "a vehicle Cleared to cross or an aircraft Cleared for Takeoff?"
    A) Figure # 14.
    B) Figure # 15.
    C) Figure # 16.

38. The airport sign shown on figure 3 indicate
    A) No-Entry to both aircraft and vehicle.
    B) No-Entry to aircraft only.
    C) No-Entry to vehicle only.

39. What does figure 1 indicate?
    A) Runway approach hold position: Hold short of aircraft on approach to runway 8 (Protecting approach or departure).
    B) Hold short of ILS critical area on runway 8.
    C) Hold short of runway and taxiway intersection.

40. Which figure identifies an outbound destination sign (tells directions to take-off runways)?
    A) Figure # 5.
    B) Figure # 9.
    C) Figure # 10.
    D) Figure # 11.

41. What is/are the color of the runway threshold lights?
    A) Green/Yellow (bi-directional).
    B) Blue/Red (bi-directional).
    C) Red/Green (bi-directional).

42. What is the color of the runway centerline light for the last 1000' of an instrument runway?
    A) All Red.
    B) All Blue.
    C) All Green.

43. At a hold position pavement marking, the runway is always on the side of the double solid lines.
    A) True.
    B) False.

2. FIGURES

Figure 1 → 8-APCH

Figure 2 → ILS

Figure 3 → ⊖

Figure 4 → B

Figure 5 → 22

Figure 6 → 4

Figure 7 →

Figure 8 →

Figure 9 → L→

Figure 10 → 22↑

Figure 11 → ↖MIL

Figure 12 →

Figure 13 → ↙A G L→

Figure 14 STEADY GREEN

Figure 15 FLASHING GREEN

Figure 16 STEADY RED

Figure 17 FLASHING RED

Figure 18 FLASHING WHITE

Figure 19 ALTERNATING RED/GREEN

Figure 20

Figure 21

Figure 22

Figure 23

3. ANSWERS TO QUESTIONS

1. B	16. C	31. A
2. B	17. C	32. D
3. A	18. B	33. D
4. B	19. A	34. A
5. C	20. --	35. C
6. A	21. B	36. A
7. C	22. A	37. A
8. A	23. B	38. B
9. A	24. B	39. A
10. D	25. B	40. C
11. C	26. A	41. C
12. A	27. A	42. A
13. A	28. C	43. B
14. B	29. C	
15. A	30. C	

20. What does the Aviation Phraseology denote?

    a.   Acknowledge – Let me know you have received and understand this message.

    b.   Advise intentions – Tell me what you plan to do.

    c.   Affirmative – Yes.

    d.   Confirm – My version is … is that correct?

    e.   Correction – An error has been made in the transmission and the correct version follows.

    f.   Go ahead – State your request (never means "proceed")

    g.   Hold – Stop where you are.

    h.   Hold short of – Proceed to, but hold short of a specific point.

    i.   Negative – No, or permission is not granted, or that is not correct.

    j.   Proceed – You are authorized to begin or continue moving.

    k.   Read back – Repeat my message back to me.

    l.   Say again – Repeat what you just said.

    m. Standby – Wait … I will get back to you. (Standby is not an approval or a denial. The caller should reestablish contact of the delay is lengthy.)

    n.   Unable – Indicates inability to comply with a specific instruction, request, or clearance.

    o.   Verify – I have received you message, understand it, and will comply.