

CHAPTER 14

PO 160 – PARTICIPATE IN AERODROME OPERATIONS ACTIVITIES



ROYAL CANADIAN AIR CADETS

LEVEL ONE

INSTRUCTIONAL GUIDE



SECTION 1

EO M160.01 – IDENTIFY MAJOR AERODROME COMPONENTS

Total Time:	30 min
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INTRODUCTION

PRE-LESSON INSTRUCTIONS

The instructor shall review the lesson content and become familiar with the material prior to instruction of the lesson.

A complete list of resources needed for the instruction of this EO is located at Chapter 2 of the QSP. Specific uses for said stores are identified throughout the Instructional Guide, within the teaching point for which they are required.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

The interactive lecture method was chosen as it allows the instructor to make a semi-formal presentation of the material where the cadets can participate by asking or responding to questions and commenting on the material. For this lesson, this method is most effective as it matches well the taxonomic level of the material and is age-appropriate by virtue of its participatory nature.

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall be expected to identify the major components of an aerodrome, to include:

- runway;
- taxiway;
- apron;
- hangars;
- ramp areas;
- control towers;
- terminal buildings;

- wind socks;
- flying schools; and
- fire department.

IMPORTANCE

Knowing the various components of an aerodrome will assist cadets in identifying the components during aerodrome tours and familiarization flights. This information will also be useful in future lessons, including the activity associated with EO M160.03 (Section 3).

Teaching Point 1

Define the Terms Aerodrome and Airport

Time: 3 min

Method: Interactive Lecture



It is recommended that the instructor use the images of the various parts of the aerodrome found in Annex A, or refer the cadets to the images in their interactive handbooks, to supplement the other training aids they have prepared for this lesson.

AERODROME

Around the world there is an intricate system of aeronautical facilities designed to facilitate the efficient movement of air traffic. These many aerodromes vary widely in the facilities and the services they offer. However, there are certain standard features that apply to every aerodrome.

An aerodrome is any area of land or water designed for the arrival, departure and movement of aircraft (*From the Ground Up: Millennium Edition, 2000, p. 91*).

AIRPORT

An airport is a licensed aerodrome, which possesses a certificate stating it has met all airport safety standards (*From the Ground Up: Millennium Edition, 2000, p. 91*).

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

- Q1. What is the definition of an aerodrome?
- Q2. What makes an airport different from an aerodrome?

ANTICIPATED ANSWERS

- A1. An aerodrome is any area of land or water, designed for the arrival, departure and movement of aircraft.
- A2. An airport possesses a certificate stating it has met all airport safety standards.

Teaching Point 2**Identify Aerodrome Components**

Time: 7 min

Method: Interactive Lecture

RUNWAY

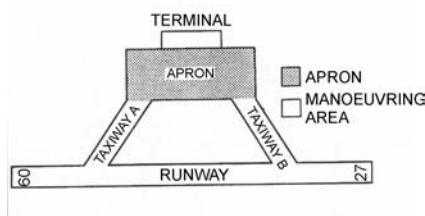
The runway is the area where aircraft take-off and land. A runway may be made of pavement, grass, gravel, dirt or snow among other materials. Runways are identified by numbers and by the white lights that run along each side.

TAXIWAY

The taxiway is the area used by an aircraft to manoeuvre around the aerodrome between aprons and runways. Letters normally designate taxiways. At aerodromes with lighting, taxiways are defined by blue lights along each side.

APRON

The apron, also known as the tarmac or ramp area, is the part of an aerodrome intended to accommodate the loading and unloading of passengers and cargo. It is also the area used for refuelling, servicing and parking of aircraft.



Royal Canadian Air Cadet Manual, Proficiency Level One Handbook, Cadets Canada, 1998

Figure 14-1-1 Aerodrome Movement Areas

HANGAR

The hangar is an aerodrome building that is used for storage, protection and maintenance of aircraft.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

- Q1. What types of material can a runway be made of?
- Q2. What is the purpose of a taxiway?
- Q3. What is the purpose of a hangar?

ANTICIPATED ANSWERS

- A1. Runways can be made of pavement, grass, gravel, dirt or snow.
- A2. The taxiway is the area used by an aircraft to move from the apron to the runway.
- A3. A hangar is an aerodrome building used to store, protect and maintain an aircraft.

Teaching Point 3**Identify Aerodrome Components**

Time: 7 min

Method: Interactive Lecture

CONTROL TOWER

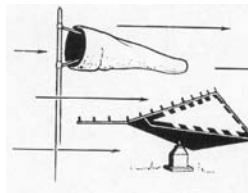
Some aerodromes have the service of a control tower to ensure the safe and efficient movement of aircraft. The air traffic controllers in the tower are responsible for a number of procedures. These include take-off/landing procedures, circuit procedures and ground manoeuvring of aircraft.

TERMINAL BUILDINGS

Terminal buildings are used for passengers arriving and departing. They are also used for baggage and cargo handling. Terminal buildings are normally located on the apron.

WINDSOCK

All aerodromes have at least one windsock or wind t. The windsock is used by pilots to determine wind direction and speed. The approximate wind speed is indicated by the amount the windsock is extended. The wind t is designed like an arrow whose small end points into the wind. They are found on the airfield, normally beside the runway.



From the Ground Up : Millennium Edition, A.F. MacDonald, 2000

Figure 14-1-2 Windsock and Wind T

FLYING SCHOOLS

Flying schools are used as training facilities for current pilots and those that wish to pursue such a career.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

- Q1. What is the purpose of the control tower?
- Q2. What does a windsock indicate?
- Q3. What is the importance of flying schools?

ANTICIPATED ANSWERS

- A1. The purpose of the control tower is to provide the service of ensuring the safe and efficient movement of aircraft, through use of the air traffic controllers working within the tower.
- A2. A windsock indicates wind direction and speed.
- A3. Flying schools are used as training facilities for current pilots and those that wish to pursue such a career.

END OF LESSON CONFIRMATION

ACTIVITY

Time: 7 min

OBJECTIVE

The objective of this activity is to confirm that the cadets are able to correctly identify various components of an aerodrome.

RESOURCES

N/A.

ACTIVITY LAYOUT

- Divide cadets into groups of four to five.
- Have them complete the exercise in their interactive handbooks on page _____ by:
 - finding all of the aerodrome components embedded in the word search; and
 - match each aerodrome component found with the appropriate picture on the slides.
- After five minutes has passed, take two minutes to confirm the cadets' success with the exercise.

SAFETY

N/A.

INSTRUCTOR GUIDELINES

N/A.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

There is no formal assessment of this EO. Instructors will confirm the cadets' comprehension of the material during the end of lesson check and when they construct a model aerodrome during the activity associated with EO M160.03 (Section 3).

CLOSING STATEMENT

The various areas of an aerodrome serve different purposes. As cadets, knowing the various components of an aerodrome will assist in identifying the components during tours and familiarization flights.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

- A3-001 A-CR-CCP-263/PT-001, *From the Ground Up: Millennium Edition* (2000). Ottawa, ON: Aviation Publishers Co. Limited.
- C3-022 (ISBN 0-19-541731-3) *The Canadian Oxford Dictionary* (2001). Don Mills, ON: Oxford University Press.



ROYAL CANADIAN AIR CADETS

LEVEL ONE

INSTRUCTIONAL GUIDE



SECTION 2

EO M160.02 – IDENTIFY FEATURES OF A RUNWAY

Total Time:

30 min

INTRODUCTION

PRE-LESSON INSTRUCTIONS

A complete list of resources needed for the instruction of this EO is located at Chapter 2 of the QSP. Specific uses for said stores are identified throughout the Instructional Guide, within the teaching point for which they are required.

Prior to instructing this lesson the instructor shall:

- review the lesson content and become familiar with the material, and
- ensure there is a sufficient amount of flipchart paper and markers for the end of lesson confirmation.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

The interactive lecture method was chosen as it allows the instructor to make a semi-formal presentation of the material where the cadets can participate by asking or responding to questions and commenting on the material. For this lesson, this method is most effective as it matches well the taxonomic level of the material and is age-appropriate by virtue of its participatory nature

REVIEW

The pertinent review for this lesson will include components of an aerodrome EO M160.01 (Section 1).

OBJECTIVES

By the end of this lesson the cadet shall be expected to identify characteristics of runways including:

- numbering;
- runway lights; and
- runway markings.

IMPORTANCE

Understanding the features of a runway will be helpful during tours and familiarization flights. The various features of runways will be referred to in future aviation lessons at the squadron and the CSTC. In the aviation industry, pilots and air traffic controllers require this information to perform their jobs.

Teaching Point 1**Discuss Runway Lights**

Time: 5 min

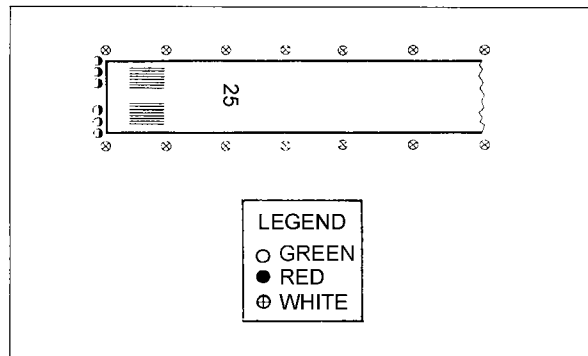
Method: Interactive Lecture



A recommended method for presenting this information could be for the instructor to create a large runway on the floor, whiteboard or flipchart.

RUNWAY LIGHTS

Runways are lined down both sides by white lights. These lights are used to define the overall area of the runway on each side. Runways also contain red/green lights at the ends. These lights are double sided with red on one side and green on the other. The red side of the lights faces toward the runway and indicates the end of the runway. The green side faces away from the runway and shows the beginning of the runway to aircraft that are landing.



Royal Canadian Air Cadet Manual, Proficiency Level One Handbook, Cadets Canada, 1998

Figure 14-2-1 Runway Lights

CONFIRMATION OF TEACHING POINT 1**QUESTIONS**

- Q1. What colour lights define the runway on each side?
 Q2. What is the importance of the red/green lights?

ANTICIPATED ANSWERS

- A1. White lights.
 A2. They indicate the end of the runway (red side) as well as the beginning of the runway for the aircraft preparing to land (green side).

Teaching Point 2**Discuss Runway Numbering**

Time: 5 min

Method: Interactive Lecture

RUNWAY NUMBERING

The runway number is always indicated in large print at the end of the runway. Runways are numbered according to their magnetic direction and are rounded off to the nearest ten degrees. Once rounded, the hundreds and tens digits are used to number the runway. For example, a runway that points in the direction of 266 degrees magnetic would be numbered 27. Therefore, the highest runway number possible is 36 (360 degrees).



Supplemental information for the instructor (do not teach): When runways run parallel, they are designated left or right (e.g. 27L and 27R). The runway number is displayed at the approach end of each runway. A single runway would, therefore, have different numbers at each of its two ends. These numbers would be 180 degrees apart. For example, runway 09 would be numbered 27 at the other end.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

- Q1. On what basis are runways numbered?
- Q2. If a runway points in the direction of 176 degrees magnetic, how would it be numbered?
- Q3. If a runway points in the direction of 43 degrees magnetic, how would it be numbered?

ANTICIPATED ANSWERS

- A1. Their magnetic direction.
- A2. 18 (Round 176 to 180, and use only the hundreds and tens digits).
- A3. 04 (Round 43 to 40, and use only the hundreds and tens digits).

Teaching Point 3**Discuss Other Runway Markings and Lights**

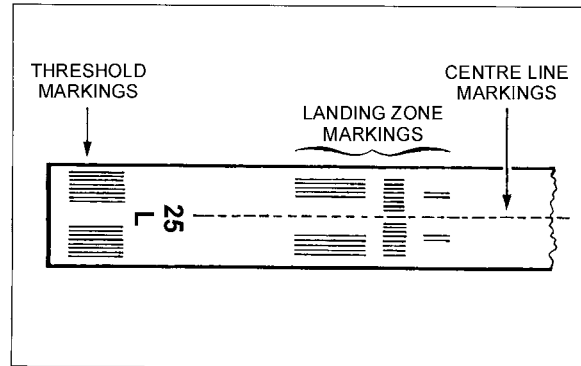
Time: 5 min

Method: Interactive Lecture

RUNWAY MARKINGS

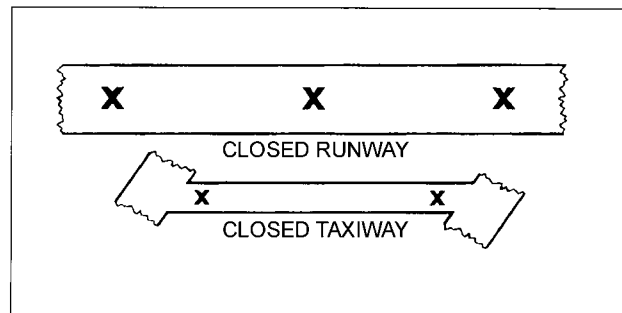
Runways have other distinct markings:

- **Centerline Markings.** The centerline markings, which are white dashed lines, designate the center of the runway. Pilots use these markings to line-up the aircraft to the middle of the runway during landing.
- **Landing Zone Markings.** Landing zone markings give the pilot a general area where it is desirable to touch down.
- **Threshold Markings.** Threshold markings indicate the beginning and the end of the runway. They are indicated by white lines at the threshold.
- **Aerodrome Danger Markings.** These are areas that may be dangerous or unserviceable. These areas are signified by large white Xs on the unserviceable runways or taxiways.



Royal Canadian Air Cadet Manual, Proficiency Level One Handbook, Cadets Canada, 1998

Figure 14-2-2 Runway Markings



Royal Canadian Air Cadet Manual, Proficiency Level One Handbook, Cadets Canada, 1998

Figure 14-2-3 Runway Danger Markings

OTHER RUNWAY LIGHTS

Obstruction lights are present to identify possible structures that may obstruct a plane while attempting to take-off and/or land. Also, windsocks are lit so pilots can use them at night.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

- Q1. What are the markings that indicate the beginning and the end of the runway?
- Q2. What does a large white X signify on a runway or a taxiway?
- Q3. What are obstruction lights used for?

ANTICIPATED ANSWERS

- A1. Threshold markings.
- A2. Areas which may be dangerous or unserviceable.
- A3. Obstruction lights are used to identify possible structures that may obstruct a plane while attempting to take off or land.

END OF LESSON CONFIRMATION

ACTIVITY

Time: 7 min

OBJECTIVE

The objective of this activity is to confirm that the cadets can identify the various features of a runway.

RESOURCES

- flipchart paper.
- flipchart markers.

ACTIVITY LAYOUT

Divide the cadets into groups of four. Give each group a sheet of flipchart paper along with flipchart markers. The cadets will have five minutes to create a runway using the materials provided. The items that must be included on the runway are:

- threshold markings;
- red/green lights;
- runway numbers;
- center line;
- aerodrome landing markings;
- danger markings; and
- white lights.

SAFETY

N/A.

INSTRUCTOR GUIDELINES

The instructor will confirm that the cadets have included all items.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

There is no formal assessment of this EO. Instructors will confirm the cadets' comprehension of the material during the end of lesson check and when they construct a model aerodrome during the activity associated with EO M160.03 (Section 3).

CLOSING STATEMENT

Being familiar with the various features of runways can assist cadets in a number of areas of their training. Understanding the features of a runway enhances cadet knowledge of aerodrome components and gives further insight into the runways' role with respect to take-off and landing procedures of aircraft.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

A3-001 A-CR-CCP-263/PT-001, *From the Ground Up: Millennium Edition* (2000). Ottawa, ON: Aviation Publishers Co. Limited.



ROYAL CANADIAN AIR CADETS

LEVEL ONE

INSTRUCTIONAL GUIDE



SECTION 3

EO M160.03 – CONSTRUCT A MODEL AERODROME

Total Time:

60 min

INTRODUCTION

PRE-LESSON INSTRUCTIONS

A complete list of resources needed for the instruction of this EO is located at Chapter 2 of the QSP. Specific uses for said stores are identified throughout the Instructional Guide, within the teaching point for which they are required.

Prior to instructing this lesson the instructor shall:

- review the lesson content, and become familiar with the lesson material;
- ensure all of the materials required for the activity are present; and
- ensure the classroom layout is properly set-up before commencing the class.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

The small group activity was selected to allow for maximum participation in the learning process. It is an interactive way to illustrate and substantiate the material taught in EO M160.01 (Section 1) and EO M160.02 (Section 2).

The group discussion method was chosen to allow the cadets to share their knowledge, opinions, and feelings about the subject matter while still allowing the instructor to control the direction of the discussion. The instructor must ensure that points not brought forth by the class are presented. If the instructor follows the Instructional Guide, including the questions posed, this will allow the cadets to express, in their own words, what they learned from this lesson and how they may apply the information.

REVIEW

The pertinent review for this lesson will include:

- components of an Aerodrome EO M160.01 (Section 1); and
- features of a Runway EO M160.02 (Section 2).

OBJECTIVES

By the end of this lesson the cadet shall have constructed a model aerodrome, to include the following components:

- runway;
- taxiway;
- apron;
- hangars;
- ramp areas;
- control tower;
- terminal buildings;
- wind socks;
- flying school; and
- fire department.

IMPORTANCE

Cadets have participated in a number of classes on the components of an aerodrome. As previously stated, being able to identify the various components is very important. This knowledge will prove to be useful during aerodrome visits. Also, for anyone who has an aerodrome operation career, being able to identify and describe its components is fundamental. Being able to construct an aerodrome as a group will give cadets a greater understanding of various aerodrome components.

BACKGROUND KNOWLEDGE

RUNWAY

The runway is the area where aircraft take-off and land. A runway may be made of pavement, grass, gravel, dirt or snow among other materials. Runways are identified by numbers and by the white lights that run along each side.

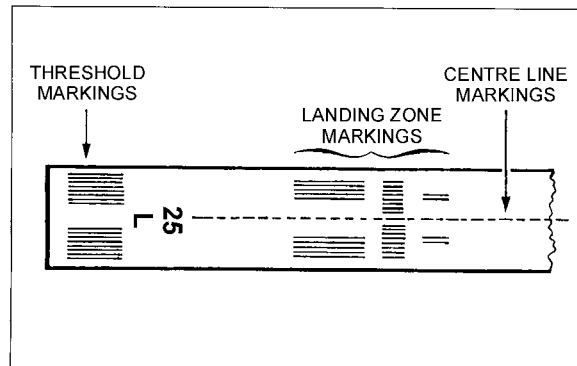
Runways also contain red/green lights at the ends. These lights are double sided with red on one side and green on the other. The red side of the lights faces toward the runway and indicates the end of the runway. The green side faces away from the runway and shows the beginning of the runway to aircraft that are landing.

The runway number is always indicated in large print as a two-digit number at the end of the runway. Runways are numbered according to their magnetic direction and are rounded off to the nearest ten degrees. Once rounded, the hundreds and tens digits are used to number the runway. For example, a runway that points in the direction of 266 degrees magnetic would be numbered 27. Therefore, the highest runway number possible is 36 (360 degrees).

Runways have other distinct markings:

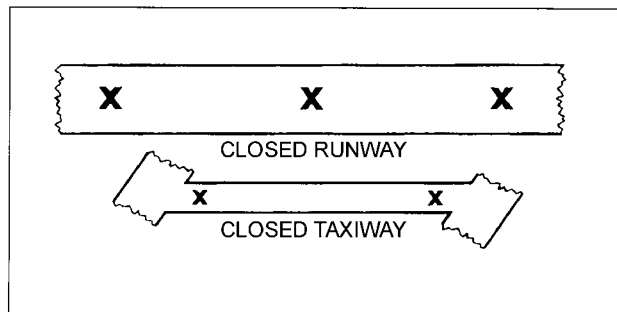
- **Centerline Markings.** The centerline markings, which are white dashed lines, designate the center of the runway. Pilots use these markings to line-up the aircraft to the middle of the runway during landing.
- **Landing Zone Markings.** Landing zone markings give the pilot a general area where it is desirable to touch down.
- **Threshold Markings.** Threshold markings indicate the beginning and the end of the runway. They are indicated by white lines at the threshold.

- **Aerodrome Danger Markings.** These are areas that may be dangerous or unserviceable. These areas are signified by large white Xs on the unserviceable runways or taxiways.



Royal Canadian Air Cadet Manual, Proficiency Level One Handbook, Cadets Canada, 1998

Figure 14-3-1 Runway Markings



Royal Canadian Air Cadet Manual, Proficiency Level One Handbook, Cadets Canada, 1998

Figure 14-3-2 Runway Danger Markings

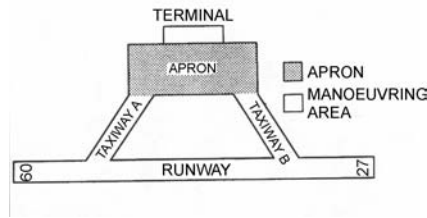
- **Obstruction Lights.** These lights are present to identify possible structures that may obstruct a plane while attempting to take-off and/or land. Also, windsocks are lit so pilots can use them at night.

APRON

The apron, also known as the tarmac or ramp area, is the part of an aerodrome intended to accommodate the loading and unloading of passengers and cargo. It is also the area used for refuelling, servicing and parking of aircraft.

TAXIWAY

The taxiway is the area used by an aircraft to manoeuvre around the aerodrome between aprons and runways. Taxiways are normally designated by letters. At aerodromes with lighting, taxiways are defined by blue lights along each side.



Royal Canadian Air Cadet Manual, Proficiency Level One Handbook, Cadets Canada, 1998

Figure 14-3-3 Aerodrome Movement Areas

HANGAR

The hangar is an aerodrome building that is used for storage, protection and maintenance of aircraft.

CONTROL TOWER

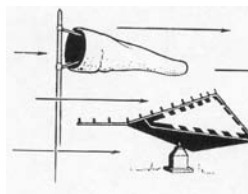
Some aerodromes have the service of a control tower to ensure the safe and efficient movement of aircraft. The air traffic controllers in the tower are responsible for a number of procedures (take-off/landing procedures, circuit procedures and ground manoeuvring of aircraft).

TERMINAL BUILDING

Terminal buildings are used for passengers arriving and departing and are also used for baggage and cargo handling. Terminal buildings are normally located on the apron.

WIND SOCK

All aerodromes have at least one windsock or wind t. The windsock is used by pilots to determine wind direction and speed. The approximate wind speed is indicated by the amount the windsock is extended. The wind t is designed like an arrow whose small end points into the wind. They are found on the airfield, normally beside the runway.



From the Ground Up: Millennium Edition, A.F. MacDonald, 2000

Figure 14-3-4 Windsock and Wind T

FLYING SCHOOL

Flying schools are used as training facilities for current pilots and those that wish to pursue such a career.

ACTIVITY – CONSTRUCT A MODEL AERODROME

Time: 35 min

OBJECTIVE

The objective of this activity is to confirm the information taught during the previous two lessons on aerodrome operations.

RESOURCES

The materials recommended for the construction of the model aerodromes are:

- Bristol board.
- Construction paper.
- Cardboard.
- Small boxes (shoe box size).
- White chalk.
- Stick pins.
- Colour markers.
- Scissors.
- Glue.
- Masking tape.



- Other materials may be used beyond this list if available at the corps/squadron.
- The amount of materials needed will depend on class size and number of groups.

ACTIVITY LAYOUT

- Place the cadets into groups of four to five.
- Inform the cadets of the materials available for them to use.
- Inform the cadets they are all to start with a base of four pieces of bristol board (two by two taped together).
- Display a diagram outlining the ideal locations for the components of a model aerodrome as detailed in Annex A.
- Have each group create their own model aerodrome, ensuring all of the components are properly labelled.



While cadets are encouraged to be creative with the materials provided, the instructor may recommend the following uses for the resources listed above:

- cardboard, poster board and small boxes – can be used for the construction of small buildings;
- white chalk – can be used for runway numbering and markings on bristol board;
- multi-coloured markers – can be used for labelling the various components and adding specific details to them;
- construction paper – can be used with cardboard/small boxes if a specific colour for the building/component is required;
- stick pins – can be used for the lighting at an aerodrome (taxiway and runway lights); and
- glue and masking tape – can be used to hold the various components together.

SAFETY

N/A.

INSTRUCTOR GUIDELINES



At this point the instructor shall brief the cadets on any safety rules or any other guidelines pertaining the activity.

- Ensure the cadets share the supplies when creating model aerodromes.
- Assist groups in getting started if they are having difficulty.
- Supervise the cadets' work to ensure that they are following the instructions listed above.
- Once the activity has been completed, the instructor should examine the model aerodromes to ensure that all of the components are labelled properly and in their proper locations.
- After this activity has been completed, the instructor should carry on with the reflection/questioning stage.

REFLECTION

Time: 10 min

DISCUSSION QUESTIONS



TIPS FOR ANSWERING/FACILITATING DISCUSSION

- Ask questions that help facilitate discussion; in other words, avoid questions with yes or no answers.
- Prepare questions ahead of time.
- Be flexible (you are not bound to only the prepared questions).
- Encourage cadets to participate by using praise such as “great idea” or “excellent response, can anyone add to that?”.
- Try to involve everyone by directing questions to non-participants.

SUGGESTED QUESTIONS

Q1. How did the information from the last two lessons help in creating the model aerodrome?



Review the material by asking the following questions, using the models created by the cadets as training aids. Identify the various components of an aerodrome and runway that were discussed in previous classes.

SUGGESTED QUESTIONS

- Q1. What is the significance of runway markings?
- Q2. What are taxiways used for?
- Q3. What is the significance of the red/green runway lights?

SUGGESTED ANSWERS

- A1. Runway markings assist pilots in determining things such as recommended areas for take-off/touch down (threshold markings) as well as areas that are potentially unsafe (hazard markings).
- A2. Taxiways are used by pilots to move planes from the apron to the runway, or between aprons themselves.
- A3. They indicate the end of the runway (red side) as well as the beginning of the runway for the aircraft to land (green side).

CONCLUSION

REVIEW

Upon completion of the group discussion conclude by summarizing to ensure that all teaching points have been covered. Take the opportunity to explain how the cadet will apply this knowledge in the future.

MAIN TEACHING POINT

TP1. Describe the components of an aerodrome.

TP2. Describe the features of a runway.



Instructors shall reinforce those answers and comments discussed during reflection, but must ensure that the main teaching points have been covered. Any main teaching point not brought out during the group discussion shall be brought during review.

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

There is no formal assessment of this EO.

CLOSING STATEMENT

The last several EOs within aerodrome operations have focused on the components of aerodromes. Moving from an overview of the components to specific features has given a deeper insight into how aerodromes are structured. Furthermore, completing the exercise of constructing a model aerodrome should increase the cadets' knowledge of the description and location of the various components.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

- A3-001 A-CR-CCP-263/PT-001, *From the Ground Up: Millennium Edition* (2000). Ottawa, ON: Aviation Publishers Co. Limited.
- C3-022 (ISBN 0-19-541731-3) *The Canadian Oxford Dictionary* (2001). Don Mills, ON: Oxford University Press.

AIRPORT FAMILIARIZATION



Figure 14A-1 Runway

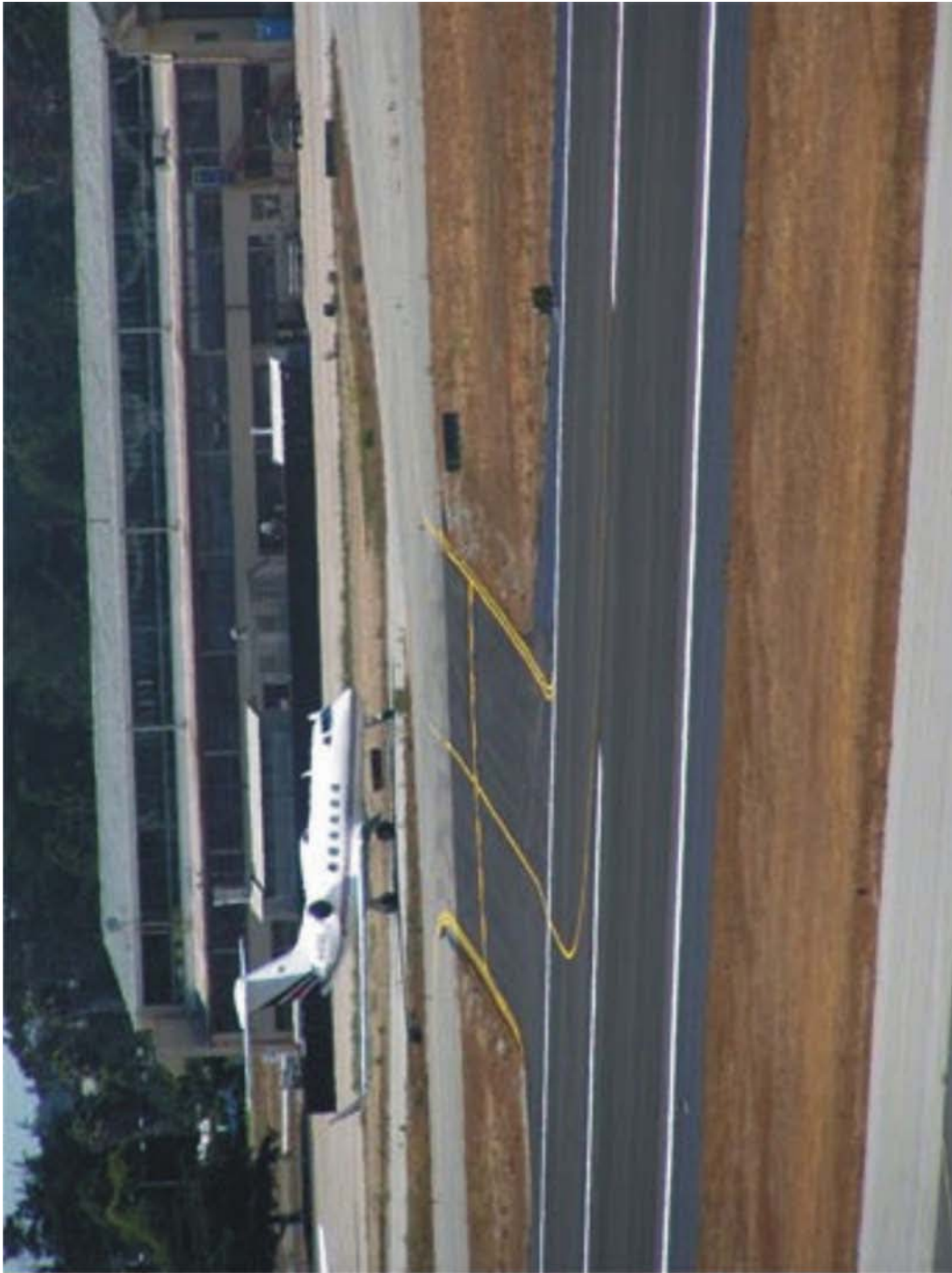


Figure 14A-2 Taxiway



Figure 14A-3 Apron



Figure 14A-4 Hangar



Figure 14A-5 Control Tower



Figure 14A-6 Terminal Building



Figure 14A-7 Windsock

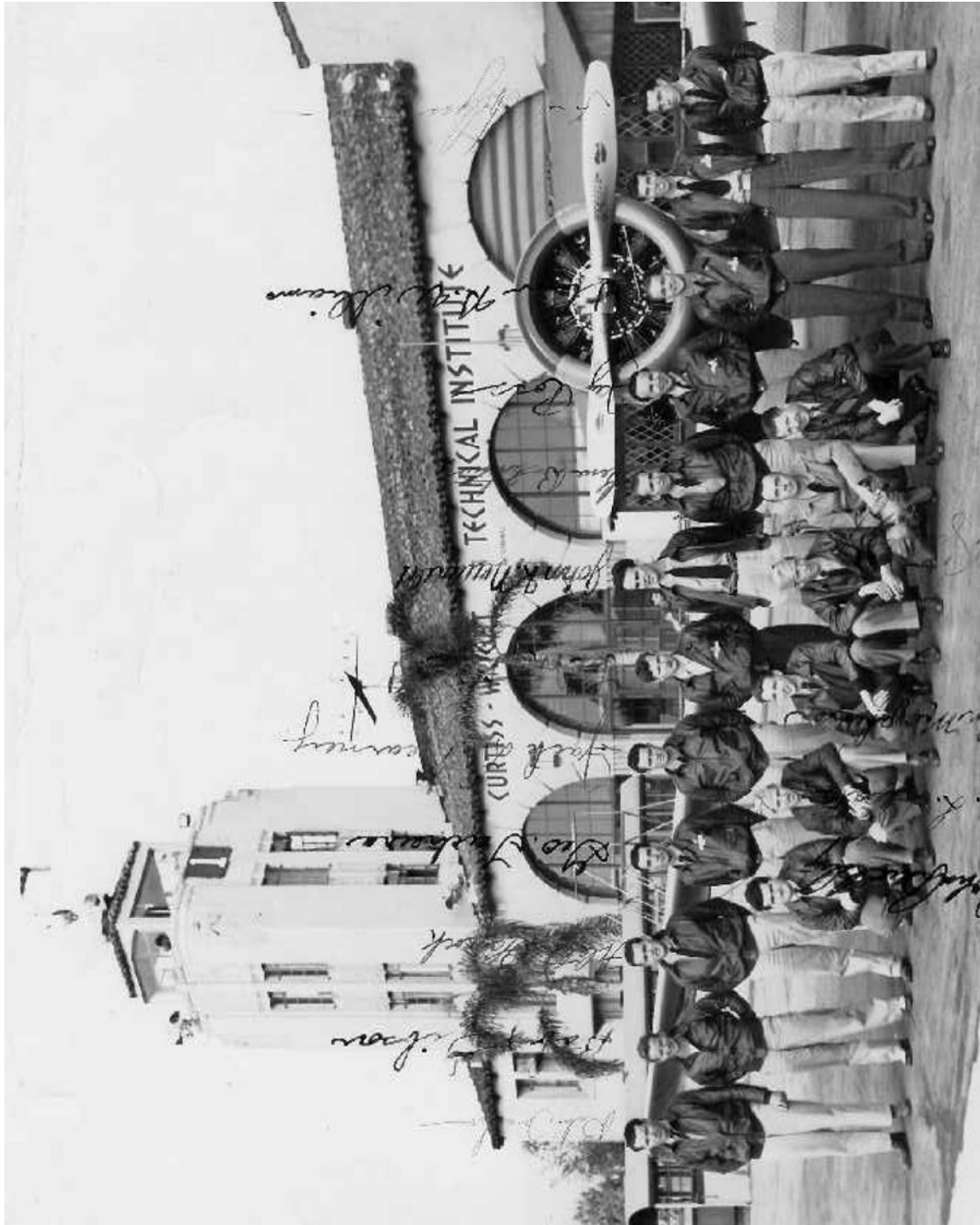


Figure 14A-8 Flying School