Australian Government
Civil Aviation Safety Authority

# ADVISORY CIRCULAR
# AC 139.E-01 v1.0


# Reporting of tall structures

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| **Date** | December 2021 |
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Advisory circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

**Advisory circulars should always be read in conjunction with the relevant regulations.**

# Audience

This advisory circular (AC) applies to:

- a person who owns, controls or operates a building or structure, including wind farm proponents
- a person who owns, controls or operates any plant or equipment which may release a hazardous plume into airspace utilised by aircraft
- Airservices Australia
- Geoscience Australia
- Part 173 of the *Civil Aviation Safety Regulations* 1998 (CASR) instrument flight procedure designers
- local government planning bodies
- aerodrome operators
- Department of Defence
- aircraft with a maximum take-off weight (MTOW) above 5,700 kg complying with Civil Aviation Order (CAO) 20.7.1B.

# Purpose

The purpose of this AC is to provide guidance to those authorities and persons involved in the planning, approval, erection, extension or dismantling of tall structures or sources of hazardous plumes so that they may understand the vital nature of the information they provide.

Information on tall structures is managed by Airservices Australia in conjunction with Geoscience Australia. Information is also provided to a range of aviation organisations so that tall structures can be identified on aeronautical charts etc.

# For further information

For further information on this AC, contact CASA's Air Navigation, Airspace and Aerodromes Branch (telephone 131 757).

Unless specified otherwise, all subregulations, regulations, Divisions, Subparts and Parts referenced in this AC are references to the *Civil Aviation Safety Regulations 1998 (CASR)*.

# Status

This version of the AC is approved by the Branch Manager, Flight Standards.

| Version | Date | Details |
|---|---|---|
| v1.0 | December 2021 | This version of this document replaces AC 139-08 v2.0 - Reporting of tall structures and hazardous plume sources and has been renumbered to reflect the Part 139 advisory circular standard practices. |
| v2.0 | March 2018 | Revised to reflect requirements in Part 175 of CASR. |
| (0) | April 2005 | Initial AC on this subject. |

# Contents

# 1 Reference material

## 1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

| Acronym | Description |
|---|---|
| AC | advisory circular |
| CAR | *Civil Aviation Regulations 1988* |
| CASA | Civil Aviation Safety Authority |
| CASR | *Civil Aviation Safety Regulations 1998* |
| DIRDC | Department of Infrastructure, Regional Development and Cities |
| ICAO | International Civil Aviation Organization |
| MOS | Manual of Standards |
| RAAF | Royal Australian Air Force |

## 1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below. Where definitions from the civil aviation legislation have been reproduced for ease of reference, these are identified by 'grey shading'. Should there be a discrepancy between a definition given in this AC and the civil aviation legislation, the definition in the legislation prevails.

| Term | Definition |
|---|---|
| obstacle | All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:<br>1. are located on an area intended for the surface movement of aircraft or<br>2. extend above a defined surface intended to protect aircraft in flight; or<br>3. stand outside those defined surfaces and that have been assessed as being a hazard to air navigation. |
| tall structure | Any obstacle, or parts thereof, that are located 100 m or more above ground level (also refer Paragraph 2.2.3). |
| plume rise | A rise in an air mass due to the temperature difference between the point of release (from the stack) and the ambient air. The resultant energy may pose a hazard for aircraft. |

## 1.3 References

### Legislation

Legislation is available on the Federal Register of Legislation website https://www.legislation.gov.au/

| Document | Title |
|---|---|
| Part 139 | Aerodromes |
| Part 175 | Aeronautical information management |
| *Airports (Protection of Airspace) Regulations 1996* | |
| *Airports Act 1996* | |

### Advisory material

CASA's advisory materials are available at https://www.casa.gov.au/publications-and-resources/guidance-materials

| Document | Title |
|---|---|
| AC 139-05 | Plume rise assessments |

### International Civil Aviation Organization documents

International Civil Aviation Organization (ICAO) documents are available for purchase from http://store1.icao.int/

| Document | Title |
|---|---|
| Annex 4 to the Chicago Convention | Aeronautical Charts |
| Annex 14 to the Chicago Convention | Aerodromes |
| Annex 15 to the Chicago Convention | Aeronautical Information Services |

# 2 Reporting of tall structures and hazardous plume sources

## 2.1 What aviation regulations apply to tall structures and plumes?

2.1.1 Part 139 of the *Civil Aviation Safety Regulations 1998* (CASR) has a number of requirements:

- Any object that extends to a height of 100 m or more above local ground level, must be notified to CASA by the proponent or owner.
- The operator of a certified aerodrome must monitor their airspace and notify CASA of any development or proposed construction in the vicinity (i.e., within 15 km) of an aerodrome if that development or construction is likely to be a hazard to air navigation.
- The operator of a certified aerodrome must monitor their airspace and notify CASA of any gaseous efflux (plume rise) which has a velocity exceeding 4.3 metres per second.
- CASA may also determine that gaseous efflux (plume rise) exceeding 4.3 metres per second is likely to pose a hazard to air navigation.
- Additionally, Annex 14 to the Chicago Convention considers any object that extends to a height of 150 m or more above local ground level must be regarded as an obstacle unless an aeronautical study indicates that it does not constitute a hazard. The height of 150 m (500 ft) above ground level is consistent with the minimum permissible height for flights over non-populous areas under regulation 91.267 of the CASR (lower heights are permitted - refer Section 2).

2.1.2 Around leased federal airports, i.e. (airports regulated under the *Airports Act 1996)*, the *Airports (Protection of Airspace) Regulations 1996* also applies. Activities that could penetrate the protected airspace of leased federal airports must be approved before the proposed penetration is permitted to occur. Those regulations require the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) to assess applications to carry out controlled activities and to impose conditions on any approval granted. DITRDC may delegate the assessment and approval of temporary intrusions—of less than three months—to the relevant airport operator.[1] DITRDC may also refuse to approve any activity that affects the safety or accessibility of aircraft operations at leased federal airports.

2.1.3 Additionally, around all aerodromes tall structures can impact on flight paths to/from the aerodrome, therefore if you are proposing a building development, crane operation, wind farm or other structure in the vicinity of an airport or aerodrome, Airservices Australia can review your application and provide advice to ensure your proposal does not compromise safe operations at the aerodrome. This service is available at:

Developments at and around airports - Airservices (airservicesaustralia.com)

2.1.4 Subpart 175.E of CASR specifies the data collection and provision requirements about structures that pose a risk to aviation safety.

[1] Further information is available at https://infrastructure.gov.au/aviation/safety/protection/leased.aspx.

2.1.5 Mandatory data collection criteria under Part 175 of CASR are broader than under Part 139 of CASR and include structures that meet at least one of the following criteria:

- have a maximum height of at least 100 m above ground level
- penetrate the obstacle limitation surface of an aerodrome
- penetrate an obstacle data collection surface, as mentioned in Appendix 8 of Annex 15, Aeronautical Information Services to the Chicago Convention on International Civil Aviation
- are an obstacle that is required to be included on an Aerodrome Obstacle Chart—ICAO Type A, as mentioned in Annex 4 to the Chicago Convention
- are an obstacle that is required to be included on an Aerodrome Obstacle Chart—ICAO Type B, as mentioned in Annex 4 to the Chicago Convention
- if Airservices Australia requires data about the object or structure in the interests of aviation safety.

## 2.2 What do I need to report?

2.2.1 The hazards that such buildings or structures may pose to aircraft requires assessment. CASA routinely performs such assessments however needs to be first notified of the obstacle, structure of source of a hazardous plume. The need to report such hazards is outlined in this AC.

2.2.2 If you are the person who owns, controls or operates the object, structure or a source of a hazardous plume which is either present, imminent or has been approved for erection/construction, details need to be provided about:

- the construction, extension or dismantling of tall structures if the top is:
  - 100 m or more above ground level

  or
  - affects the obstacle limitation surface of an aerodrome as defined in Part 139 of CASR.
- gaseous effluxes (plume rises) with a velocity of more than 4.3 metres per second affecting either:
  - airspace higher than 100 m or more above ground level

  or
  - the obstacle limitation surface of an aerodrome.

2.2.3 In addition, tall structures may pose a specific hazard for the operation of low-flying Defence aircraft or to the flight paths of arriving/departing aircraft (refer Paragraph 2.1.3). Therefore, the RAAF and Airservices Australia require information on structures that are 30 m or more above ground level—within 30 km of an aerodrome or 45 m or more above ground level elsewhere for the RAAF, or 30 m or more above ground level elsewhere for Airservices Australia.

2.2.4 Information provided for the database should be accurate and readily interpreted. The tall structure report form has been designed to help owners and/or developers in this respect. The form is available on the Airservices Australia website (including a spreadsheet for reporting multiple structures) at: https://www.airservicesaustralia.com/wp-content/uploads/Tall-Structure-Vertical-Obstacle-Form.pdf

2.2.5 Further information about where obstacle data is held is detailed in Section 2.5 of this AC.

## 2.3 Why do I need to report tall structures and hazardous plume sources?

2.3.1 Under regulation 91.265 of CASR, pilots must fly at a minimum height of 1000 ft over cities or populous areas and under regulation 91.267 of CASR can fly as low as 500 ft, with certain exceptions (refer below). Pilots must consider objects and maintain a height of 500 ft above known obstacles. At night, under the Visual Flight Rules (VFR), under regulation 91.277 of CASR, an aircraft must not be flown at a height of less than 1000 ft above the highest obstacle located within 10 nautical miles of the aircraft vicinity.

2.3.2 However, pilots are permitted to descend below these altitudes during take-off and landing manoeuvres to/from an aerodrome. Subject to regulatory approval, some pilots are also given special permission to fly below 500 ft. Such operations occur throughout Australia and include but are not limited to:

- Specialist flying activities (e.g., crop-dusting, cattle mustering, pipeline or powerline inspection, firefighting)
- search and rescue operations
- military low-level flying operations.

2.3.3 An altitude of 500 ft translates to a height of 150 m above ground level. Therefore, any buildings or structures including wind turbines that are 150 m or more above the ground are generally considered a hazard for aircraft. Other buildings at lower heights, such as those 30 m or more above ground level within 30 km or an aerodrome or 45 m above ground level elsewhere, may also pose a hazard — particularly for military aircraft.

2.3.4 If, following the assessment, the building or structure is determined as posing a hazard to aircraft operations, a recommendation will be made as to whether the risk to aircraft can be mitigated by marking or lighting of the building, structure or wind turbine.

2.3.5 Plume rises can pose a hazard to air navigation if the energy they release exceeds the capability of the aircraft and/or the pilot to maintain normal operation. Mitigation against hazardous plume sources is more challenging and may require further analysis between CASA and the proponent. This process is outlined further in AC 139-05 - Plume rise assessments.

2.3.6 In addition to the risk to aircraft operations, a collision with a tall structure poses several other risks, such as:

- business continuity if the services provided from the tall structure are unavailable e.g., communications services
- costs associated with repair/erection of a new structure
- liability issues.

2.3.7 The risk a tall structure poses to aircraft safety can be minimised if information about the tall structure is conveyed to pilots, so they can fly at a safe height above the structure. This information can be made available to pilots if an obstacle, including wind turbines, is published on aeronautical charts or included in an obstacle database.

## 2.4 Obstacle database

2.4.1 The Australian aviation community has identified a need to have information on tall structures available for publication on aeronautical charts and, more importantly, available in an obstacle database.

## 2.5 Where will the information about tall structures be held?

2.5.1 The information about tall structures is held in a central database that is managed by Airservices Australia.

2.5.2 Information on tall structures and any requests for data are available on the Airservices Australia website:

Purchasing electronic data from Airservices Australia - Airservices