ROYAL CANADIAN AIR CADETS

PROFICIENCY LEVEL TWO

INSTRUCTIONAL GUIDE

SECTION 7

EO C232.03 – IDENTIFY THE CHARACTERISTICS OF HELICOPTER ENGINES

Total Time: 60 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-802/PG-001, Chapter 4. Specific uses for said resources are identified throughout the Instructional Guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Photocopy the handouts located at Annexes A to D for each cadet. Slides may also be created of the figures in Annexes A to D.

Photocopy handouts of the paper helicopter construction templates and instructions shown in Figures A-2 and A-3 for each cadet.

Obtain a helium-filled balloon for use in TP3.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TP1 and TPs 3-6 to introduce characteristics of helicopter engines and give an overview of them.

An in-class activity was chosen for TP2 as it is an interactive way to provoke thought and stimulate an interest among cadets.

INTRODUCTION

REVIEW

The review for this lesson is from EO M232.01 (Identify Types of Aircraft Engines), to include characteristics of turboshaft gas turbine engines.

OBJECTIVES

By the end of this lesson the cadet shall identify the characteristics of helicopter engines.

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IMPORTANCE

It is important for cadets to know about the characteristics of helicopter engines because helicopters form a significant part of the Canadian Forces' lift, tactical manoeuvring and Search and Rescue capabilities.

Teaching point 1 — **Explain Technological Developments That Made Helicopters Viable**

Time: 5 min — Method: Interactive Lecture

Important challenges limited early experiments with helicopters. In particular, suitable engines did not exist in the early years. This was a problem that was not to be overcome until the beginning of the 20th century by the development of internal combustion (gasoline) powered engines. Even then, it was not until the mid-1920s that engines with sufficient power, and with the high power-to-weight ratios suitable for vertical flight became more widely available.

Early engines were made of cast iron and were too heavy for helicopters. Aluminum, a common material used on modern aircraft, was available commercially around 1890, but was extremely expensive. Aluminum was not widely used in aeronautical applications until 1920.

While many additional factors contributed in some way to the lack of progress in achieving successful vertical flight, the development of a practical helicopter had to wait until engine technology could be refined to the point that lightweight engines with considerable power could be built. By 1920, gasoline powered piston engines with higher power-to-weight ratios were more widely available. It then became possible to begin to solve the control problems of vertical flight. The era after 1920 is marked by the development of a vast number of prototype helicopters throughout the world.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. Why were early piston-powered engines too heavy for helicopter applications?

Q2. What material helped make helicopters and helicopter engines practical in 1920?

Q3. When did the work to solve vertical flight control problems begin?

ANTICIPATED ANSWERS

A1. Early piston-powered engines were too heavy because they were made of cast iron.

A2. In 1920, aluminum allowed frames and engines to be light enough for helicopters.

A3. The work to solve vertical flight control problems began when effective engines became available after 1920.

Teaching point 2 — **Make and Fly a Paper Helicopter**

Time: 20 min — Method: In-Class Activity

When a helicopter engine loses power under flight, the pilot can auto-rotate the aircraft to the ground.

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Show the cadets a slide or distribute a handout of auto-rotation flight versus normal flight in Figure A-1.

Auto-rotation is the state of flight where the main rotor is being turned by the action of the wind passing up through the rotor disc instead of being turned by engine power.

To do this the rotor must be released from the engine. This release is provided by a free-wheeling device which allows the rotor to turn even if the engine is not running.

To successfully change the downward flow of air to an effective upward flow during auto-rotation, the pitch angle of the main rotor blades must be reduced. This can be compared to lowering the nose and changing the pitch attitude of a fixed-wing aircraft in order to establish a glide.

ACTIVITY

Time: 15 min

OBJECTIVE

The objective of this activity is to have the cadets fold paper helicopters and then auto-rotate them to the ground to demonstrate that loss of engine power does not necessarily lead to a crash.

RESOURCES

Instructions and the template for folding a paper helicopter shown in Figures A-2 and A-3.

ACTIVITY LAYOUT

N/A.

ACTIVITY INSTRUCTIONS

1. Distribute the instructions and template for paper helicopter construction to each cadet.
2. Have the cadets cut out the paper helicopter and then fold it into shape.
3. Have the cadets stand and drop the helicopters.



Give the paper helicopter a spin before releasing it. This will help establish effective rotor action because, as stated by Newton's first law of motion, every object in a state of uniform motion tends to remain in that state of motion unless an external force is applied to it.

SAFETY

N/A.

CONFIRMATION OF TEACHING POINT 2

The cadets' participation in the activity will serve as the confirmation of this TP.

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Teaching point 3 **Explain Why Helicopters Have a Top Speed and Why Helicopter Rotors Have Constant Speed**

Time: 10 min Method: Interactive Lecture

The most defining characteristic of a helicopter engine is the need to maintain constant rotor speed, or a constant number of revolutions per minute (RPM), as specified by the manufacturer.

If the rotor goes too fast, lift will be lost and damage will result as the blade tips approach the speed of sound and shock waves develop. This is more significant with the long blades associated with rotary wings than it is with the shorter blades of fixed-wing aircraft propellers.

On the other hand, a rotor under load cannot be allowed to slow below the design speed because the blades rely on centrifugal force to stay horizontally extended. Because they are wings, rotor blades experience lift. The lift will cause the rotors to rise to form a “cone” if centrifugal force is insufficient to keep them horizontally extended. As the dangerously slowing rotor blades “cone” upward, lift is lost and a crash becomes imminent.



Using a helium-filled balloon, demonstrate to the cadets that centrifugal force is necessary to flatten the rotor disc as shown in Figure B-1.

When the helicopter is at rest, the outer tips of the rotor travel at a speed determined by the length of the blade and the RPM. In a moving helicopter, however, the speed of the blades relative to the air depends on the speed of the helicopter as well as on their rotational velocity. The airspeed of the rotor blade in the forward moving, or advancing, part of its rotation is much higher than that of the helicopter itself. It is possible for this blade tip to exceed the speed of sound, and thus produce vastly increased drag and vibration.



In a moving helicopter, the velocity of the blade tips relative to the air depends on the speed of the helicopter itself, as well as the speed of the blade.



Why the Rotor Can Never Be Allowed To Go Too Fast. If the rotor goes too fast, the tips of the long blades will approach the speed of sound and sonic shock waves will cause both equipment damage and loss of lift.



Why the Rotor Under Load Can Never Be Allowed To Go Too Slow. A rotor under load cannot be allowed to drop below the design speed because the blades rely on centrifugal force to stay horizontally extended. Rotor blades under load are experiencing lift and will rise to form a “cone” if centrifugal force is insufficient to keep them horizontally extended. As the dangerously slowing rotor blades “cone” upward, lift is lost and a crash becomes imminent.



Using the model helicopter, demonstrate to the cadets that one blade is retreating while the other blade is advancing at the same speed. Explain that while the helicopter is motionless on the ground or hovering, the airspeed of the advancing blade will be the same as the airspeed of the retreating blade so that each blade will develop equal lift.

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Why a Helicopter Has a Never-Exceed Velocity (VNE). As the helicopter flies faster, the true airspeed of the advancing blade's tip will increase toward the speed of sound and sonic shock waves will cause both equipment damage and loss of lift.



Background Knowledge for the Instructor Only. As well, a moving helicopter experiences a difference in lift between halves of the rotor disc because the airspeed over the advancing blade is greater than the airspeed over the retreating blade. The faster the helicopter flies, the greater this difference of lift, because the true airspeed difference of the blade-tips is twice the helicopter's airspeed. That is, to calculate the true airspeed of each blade, the helicopter's speed must be added to the airspeed of the advancing blade and subtracted from the airspeed of the retreating blade. So, increasing helicopter airspeed causes an increasing dissymmetry of lift, which will cause the machine to roll toward the loss of lift unless it is somehow corrected. This is further complicated by precession of the spinning rotor, which converts the undesired roll into undesired pitch. The usual method of equalizing lift over the advancing and retreating blades is to have greater angle of attack on the retreating blade and less angle of attack on the advancing blade, via "cyclic" pitch control. However, the blades' angle of attack adjustment has obvious limits and can only compensate for very limited airspeed. Therefore, the helicopter's airspeed design limit V_{NE} must never be exceeded, even if the machine is very powerful.

Cyclic pitch control changes the angle of attack of the blades separately, to control the helicopter's flight. Collective pitch control changes the angle of attack of both blades simultaneously to deliver more or less lifting power to the rotary wing.

CONFIRMATION OF TEACHING POINT 3

QUESTIONS

Q1. Why must a helicopter rotor never be allowed to go too fast?

Q2. Why must the rotor under load never be allowed to go too slow?

Q3. Why does a helicopter have a never-exceed speed limit?

ANTICIPATED ANSWERS

A1. If the rotor goes too fast, the tips of the long blades will approach the speed of sound and sonic shock waves will cause both equipment damage and loss of lift.

A2. If a rotor goes too slow, it will "cone" due to the lift of the rotary wing.

A3. A helicopter has a never-exceed speed limit to prevent sonic shock at the blade tips.

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Teaching point 4 **Explain How Lift of the Main Rotor Is Changed During Flight**

Time: 5 min Method: Interactive Lecture



To increase the lift of a fixed-wing aircraft, the wing's angle of attack is increased. This is also true of a rotary wing.

Changing the pitch angle on the blades changes the blade angle and lift. With a change in angle of attack and lift comes a change in drag and, therefore, the speed or RPM of the rotors could be affected. As the blades' angle of attack is increased, drag increases and so the rotor speed would decrease if it were allowed. Decreasing the blades' angle of attack decreases drag, and so rotor speed would increase if it were allowed.

To maintain a constant rotor speed, which is essential in helicopter operation, a proportionate change in power is required to compensate for the change in drag. A correlator and/or governor is the most common way to accomplish this. The engine is allowed to speed up or slow down according to the load on the rotor, but the rotor speed remains unchanged.

This feature of rotary-wing flight imposes requirements on helicopter engine design. In the turboshaft engines used on most helicopters, the turbine powering the engine's compressor is separate from the turbine powering the shaft that drives the main rotor.

CONFIRMATION OF TEACHING POINT 4

QUESTIONS

Q1. How is lift increased with a rotary wing?

Q2. What else increases when the wing's angle of attack is increased?

Q3. How does a helicopter engine prevent the rotor from slowing when drag increases?

ANTICIPATED ANSWERS

A1. Increasing the wing's angle of attack increases lift with a rotary wing.

A2. Drag increases when the wing's angle of attack is increased.

A3. A proportionate change in power is required to compensate for the increase in drag.

Teaching point 5 **Explain That Most Helicopters Use Turboshaft Engines**

Time: 5 min Method: Interactive Lecture

Although piston-powered engines are still used in some general-aviation helicopters, most helicopters produced are for military or commercial use and feature gas turbine engines, which have high power-to-weight ratios.



Show the cadets a slide or distribute a handout of the turboshaft engine schematic in Figure C-1.

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Gas turbines can maintain constant rotor speed separate from the speed of the engine itself and in this configuration they are referred to as turboshaft engines. In particular, an engine designed for turboshaft use will generally have one turbine for the engine's own air compressor and a second, separate turbine for powering the drive shaft, which turns the main rotor. The engine itself, because it has a separate compressor turbine, can speed up or slow down as necessary to provide the right amount of high-velocity exhaust gases for the second turbine, keeping the rotor speed constant.

Turboshaft engines are also used to power tanks and ships as well as having stationary applications.

CONFIRMATION OF TEACHING POINT 5

QUESTIONS

Q1. Who uses helicopters?

Q2. What type of engine is found in most helicopters?

Q3. How many turbines does a turboshaft engine have?

ANTICIPATED ANSWERS

A1. Most helicopters are used in the military or commercially.

A2. Most helicopters have gas turbine engines configured as turboshafts.

A3. A turboshaft engine has two turbines; one for its own compressor and one for the main rotor.

Teaching point 6 **Identify CF Helicopters and Discuss Their Associated Engines**

Time: 10 min Method: Interactive Lecture



Show the cadets slides of the CF helicopters in Figures D-1 to D-5. Discuss these machines with them, including the following application information.

CH-149 CORMORANT

The Cormorant has been chosen as Canada's new Search and Rescue (SAR) helicopter. The first of these aircraft entered squadron service in 2002 at 19 Wing Comox, and by Spring of 2004, the entire fleet of 15 Cormorants became fully operational. It has three powerful engines, long-range capability and a large cargo area. Its ice protection system, allowing it to operate in continuous icing conditions, and its ability to withstand high winds, make it ideal for Canada's demanding geography and climate.

The Agusta-Westland CH-149 Cormorant is a fully certified off-the-shelf civilian utility helicopter. It includes search and rescue-specific equipment and physical characteristics and performance requirements to meet Canada's SAR responsibilities. This modification provided reduced procurement costs, a rear-fuselage ramp, a single rescue door with both hoists on one side, and eliminated unnecessary military equipment. Shaped rotor blades, strengthened by titanium strips along the leading edge, allow the CH-149 to improve lift and increase speed, lowering the stall speed and reducing vibration. This enables it to withstand high winds (exceeding 50 knots) and provide superior gust response while carrying out routine tasks of hoisting, starting and stopping.

- Quantity in the CF: 15

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- Locations:
  - 9 Wing Gander, NF,
  - 8 Wing Trenton, ON,
  - 14 Wing Greenwood, NS, and
  - 19 Wing Comox, BC.

CH-148 CYCLONE

After a thorough pre-qualification and bid evaluation process, the Government of Canada has selected the H92 proposed by Sikorsky as the winner of the Maritime Helicopter Project. Sikorsky will be awarded two separate, but interrelated contracts. The first contract will cover the acquisition of 28 fully integrated, certified and qualified helicopters with their mission systems installed, and will also include modifications to the 12 Halifax Class ships. The second contract will be for a 20-year in-service support contract that includes a training building, and a simulation and training service.

CH-146 GRIFFON

As Canada's Utility Transport Tactical Helicopter (UTTH), the Griffon provides a robust, reliable and cost-effective capability to conduct: airlift of equipment and personnel, command and liaison flights, surveillance and reconnaissance, casualty evacuation, logistic transport, search and rescue, counter-drug operations, and domestic relief operations.

Griffons are used by Combat Support Squadrons at 3, 4 and 5 Wings to support fighter operations by providing a search and rescue capability and utility transportation support to fighter training and operations.

- Quantity in the CF: 85
- Locations:
  - Bagotville, QC,
  - Cold Lake, AB,
  - Gagetown, NB,
  - Valcartier, QC,
  - Goose Bay, NL,
  - Edmonton, AB,
  - Petawawa, ON, and
  - Borden, ON.

CH-139 JET RANGER

The 14 CH-139 Jet Rangers were purchased in 1981 for use by 3 Canadian Forces Flying Training School at CFB Portage la Prairie, in southern Manitoba, now the Southport Aerospace Centre. They are still in use today by 3 Canadian Forces Flying Training School (3 CFFTS), with upgraded avionics and air conditioning, and are maintained by the Allied Wings consortium which provides the aircraft used by 3 CFFTS.

The CH-139 Jet Ranger is a single-engine, five-seat light helicopter. It is configured with a two-bladed, semi-rigid main rotor and a two-bladed anti-torque tail-rotor. The Jet Ranger is powered by an Allison Model 250-C20B gas-turbine engine de-rated to deliver 317 shaft horsepower at sea-level.

- Quantity in the CF: 14
- Locations: 3 CFFTS Portage la Prairie

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CH-124 SEA KING

The Sea King is a ship-based helicopter with both day and night flight capabilities, and is carried aboard many Canadian Maritime Command destroyers, frigates and replenishment ships. The Sea King carries detection, navigation and weapons systems as part of its primary mandate of searching for, locating and destroying submarines. With its subsurface acoustic detection equipment and homing torpedoes, it is also a versatile surveillance helicopter.

Domestically, Sea Kings have increasingly become responsible for search and rescue operations, disaster relief, and assisting other government departments in carrying out counter-narcotic operations, fisheries and pollution patrols.

The Sea King has also been instrumental in peacekeeping operations. For example, during the deployment of forces to Somalia, the CH-124 provided troops with logistical, medical and ammunition support along with flying overland reconnaissance and convoys. It was, in effect, the only link soldiers had with the ships especially during the initial stages of the deployment.

The Sea King fleet has been heavily committed to the campaign against terrorism, deploying aboard Canadian Navy ships to the Persian Gulf since the autumn of 2001. Sea Kings have conducted hundreds of missions ranging from logistics flights to move personnel and cargo to hailing and boarding suspicious vessels.

- Quantity in the CF: 27
- Locations:
  - 12 Wing Shearwater, NS, and
  - Patricia Bay, BC.

CONFIRMATION OF TEACHING POINT 6

QUESTIONS

Q1. What engine type is common to all CF helicopters?

Q2. What is the designation of Canada’s new Maritime Helicopter?

Q3. How many engines does the CH-149 Cormorant have?

ANTICIPATED ANSWERS

A1. CF helicopters all use turboshaft engines.

A2. Canada’s new Maritime Helicopter is the CH-148 Cyclone.

A3. The CH-149 Cormorant has three turboshaft engines.

END OF LESSON CONFIRMATION

QUESTIONS

Q1. What material helped make helicopter engines practical in 1920?

Q2. Why must a helicopter rotor never be allowed to go too fast?

Q3. How does a helicopter engine prevent the rotor from slowing when drag increases?

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ANTICIPATED ANSWERS

A1. Aluminum helped make helicopter engines practical in 1920.

A2. If the rotor goes too fast, the tips of the long blades will approach the speed of sound and sonic shock waves will cause both equipment damage and loss of lift.

A3. A proportionate change in power is required to compensate for the increase in drag.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

N/A.

CLOSING STATEMENT

Rotary wing aircraft present special challenges for aviation but they offer special capabilities as well, which enable them to make important contributions to the Canadian Forces' lift, tactical manoeuvring and Search and Rescue operations.

INSTRUCTOR NOTES/REMARKS

N/A.

REFERENCES

C3-050 Department of National Defence. (2006). *Canada's Air Force, Aircraft Main Page.* Retrieved 11 October 2006, from http://www.airforce.forces.gc.ca/equip/equip1_e.asp.

C3-054 Frost, M. (2004). *Force and Movement: Making a Helicopter.* Retrieved 11 October 2006, from http://www.teacherresourcesgalore.com/physics_files/helicopter.doc.

C3-055 University of Sydney. *Helicopters. (2006).* Retrieved 12 October 2006, from http://alex.edfac.usyd.edu.au/blp/websites/Machan/heli.htm.

C3-056 US Centennial of Flight Commission. *Helicopters. (2003).* Retrieved 12 October 2006, from http://www.centennialofflight.gov/essay/Dictionary/helicopter/DI27.htm.

C3-061 Leishman, J.G. (2000). *A History of Helicopter Flight.* Retrieved 1 November 2006, from http://www.glue.umd.edu/~leishman/Aero/history/html.

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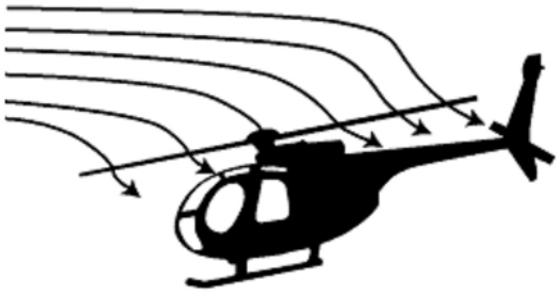
INSTRUCTIONS AND TEMPLATE FOR FOLDING A PAPER HELICOPTER



NORMAL POWERED FLIGHT



AUTO-ROTATION FLIGHT

Jeppesen Standard Training Products, A&P Technician General Textbook, Jeppesen Sanderson Training Systems (p. 2-66)

Figure A-1 Auto-rotation Flight vs. Normal Powered Flight

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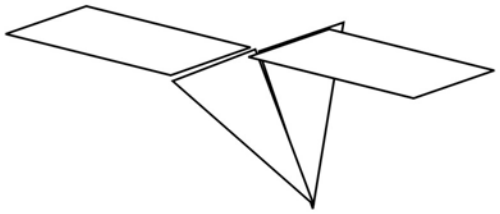
MAKE A HELICOPTER

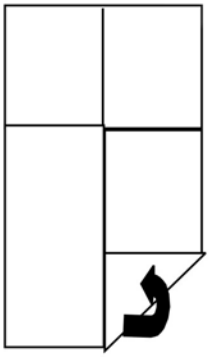
AIM: TO MAKE A TWIRLING HELICOPTER.

YOU WILL NEED: A HELICOPTER SHEET, SCISSORS, COLOURING PENCILS, PAPER CLIPS FOR WEIGHTS

WHAT TO DO:

1. COLOUR THE HELICOPTER SHEET.
2. CUT ALONG THE DOTTED LINES.
3. FOLD CORNERS A AND B TO MEET THE CENTRE LINE
4. FOLD E AND F IN THE OPPOSITE DIRECTIONS.





5. TEST YOUR HELICOPTER BY DROPPING IT FROM A HIGH PLACE (E.G. STANDING ON A RAISED PLATFORM).
6. DISCUSS WHAT HAPPENS.

THINGS TO TRY

DOES THE WAY THE FLAPS ARE BENT MAKE A DIFFERENCE TO THE HELICOPTER'S FALL?

ADD EXTRA WEIGHT TO YOUR HELICOPTER. DOES THIS MAKE A DIFFERENCE.

MAKE A NEW HELICOPTER WITH LONGER BLADES. HOW DOES IT WORK?

"Force and Movement" Making a Helicopter. Retrieved 11 October 2006, from http://www.teacherresourcesgalore.com/physics_files/helicopter.doc

Figure A-2 Instructions for Paper Helicopter Construction

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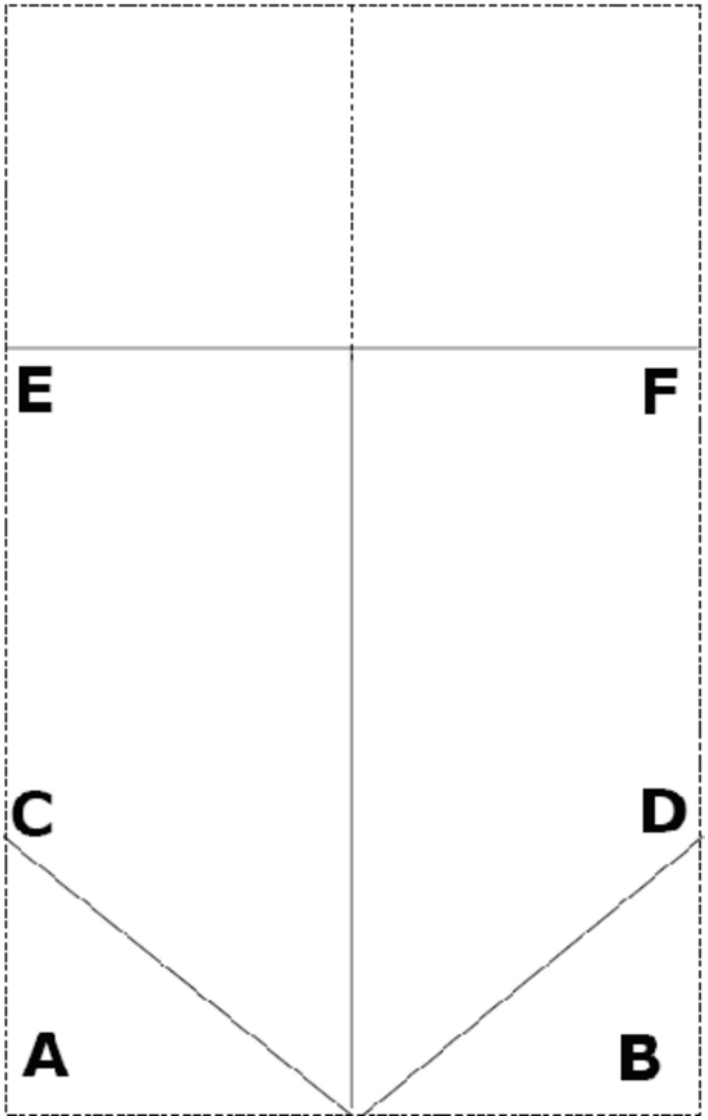
PAPER HELICOPTER TEMPLATE



"Force and Movement: Making a Helicopter". Retrieved 11 October 2006, from http://www.teacherresourcesgalore.com/physics_files/helicopter.doc

Figure A-3 Template for Paper Helicopter Construction

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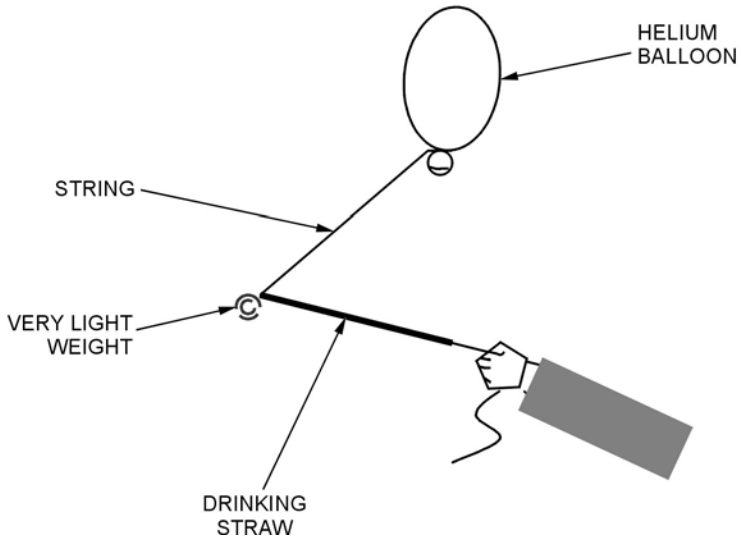
CENTRIFUGAL FORCE FLATTENS A ROTOR DISC



D Cdts 3, 2007 Ottawa, ON: Department of National Defence

Figure B-1 Centrifugal Force Prevents Lift from Coning the Rotor Disc

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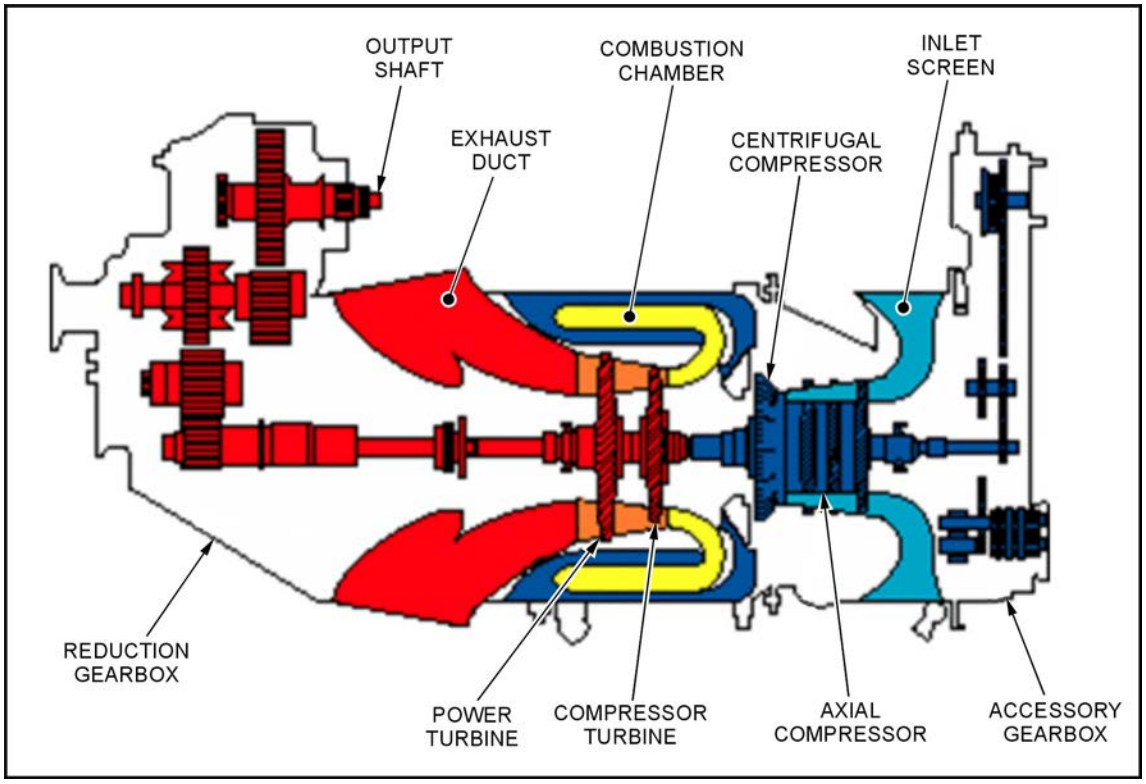
TURBOSHAFT ENGINE SCHEMATIC



Imagine the Power, Pratt & Whitney Canada. Retrieved 16 March 2007, from http://www.pwc.ca/en/3_0/3_0_3/3_0_3_3_1.asp

Figure C-1 Turboshaft Engine Schematic – Separate Turbines

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CF HELICOPTERS



FACTS AND FIGURES - CH-149 CORMORANT

LENGTH:	22.8 m
ROTOR SPAN:	18.5 m
HEIGHT:	6.5 m
WEIGHT:	14 600 kg (MAXIMUM TAKE-OFF)
POWER:	THREE GENERAL ELECTRIC T700-T6A1 TURBOSHAFTS
SPEED:	278 km/h
RANGE:	1018 km

Canadian Forces. Aircraft. (2005). Retrieved 25 March 2007, from http://www.airforce.gc.ca/equip/equip1_e.asp

Figure D-1 CH-149 Cormorant

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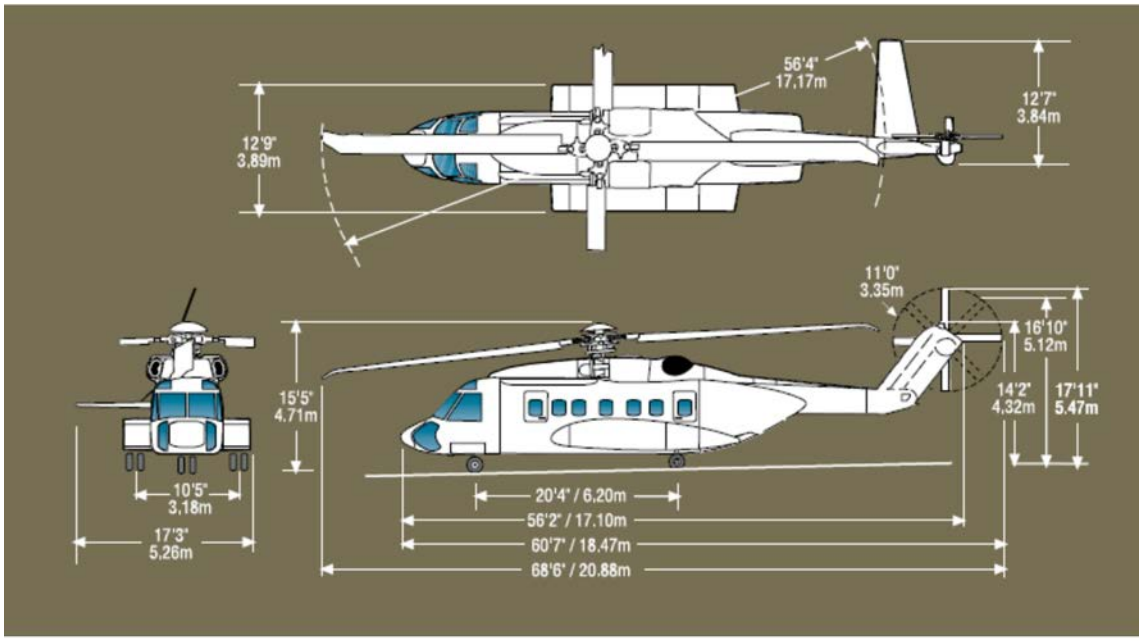
Verify against the official publication.



Canadian Forces. Aircraft. (2005). Retrieved 25 March 2007, from http://www.airforce.gc.ca/equip/equip1_e.asp

Figure D-2 CH-148 Cyclone



THE S-92 SUPERHAWK FEATURES TWO GENERAL ELECTRIC CT7-8A TURBOSHAFT ENGINES WITH INTEGRAL PARTICLE SEPARATOR AND PNEUMATIC STARTING SYSTEM. IN ADDITION, THE AIRCRAFT INCLUDES A HONEYWELL 36-150 AUXILIARY POWER UNIT FOR ON THE GROUND OR IN THE AIR EMERGENCY POWER.

Sikorsky. S-92 Superhawk Helicopter (2006). Retrieved 25 March 2007, from http://www.sikorsky.com/details/0,,CLI1_DIV69_ETI2280,00.html

Figure D-3 Sikorsky S-92 Superhawk

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Verify against the official publication.



FACTS AND FIGURES - CH-146 GRIFFON

LENGTH:	17.1 m
ROTOR SPAN:	14 m
HEIGHT:	4.6 m
WEIGHT:	5355 kg
POWER:	PRATT AND WHITNEY'S PT6T-3D TURBOSHAFT ENGINE
SPEED:	220 km/h
RANGE:	656 km

Canadian Forces. Aircraft. (2005). Retrieved 25 March 2007, from http://www.airforce.gc.ca/equip/equip1_e.asp

Figure D-4 CH-146 Griffon

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.



FACTS AND FIGURES - CH-139 JET RANGER

EMPTY WEIGHT:	839 kg
MAX WEIGHT:	1451 kg
HEIGHT:	3.53 m
LENGTH:	(INCLUDING MAIN ROTOR) 11.9 m
SPEED:	130 knots
WIDTH:	(FUSELAGE AND SKID GEAR) 1.92 m
DIAMETER OF MAIN ROTOR:	10.16 m
MAX OPERATING ALTITUDE:	6100 m
ENGINE:	ALLISON MODEL 250-C20B TURBOSHAFT ENGINE

Canadian Forces. Aircraft. (2005). Retrieved 25 March 2007, from http://www.airforce.gc.ca/equip/equip1_e.asp

Figure D-5 CH-139 Jet Ranger

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.



FACTS AND FIGURES - CH-124 SEA KING

WEIGHT:	9299 kg
POWER:	TWO 1500 SHP GENERAL ELECTRIC T-58-GE-8F/-100 TURBOSHAFTS
SPEED:	144 km/h MAX SPEED 181 km/h
CEILING:	3048 m
RANGE:	450 km
LOAD:	2268 kg

Canadian Forces. Aircraft. (2005). Retrieved 25 March 2007, from http://www.airforce.gc.ca/equip/equip1_e.asp

Figure D-6 CH-124 Sea King

Unofficial convenience copy of A-CR-CCP-802/PF-001, cached 2026-11-08 from https://app.cadets.gc.ca/cadet-publications/A-CR-CCP-802-PF-001/A-CR-CCP-802-PF-001.pdf.
Verify against the official publication.

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