


VDFP General Aviation Firefighting for Structural Firefighters

VIRGINIA DEPARTMENT OF FIRE PROGRAMS
Aviation Firefighting for Structural Firefighters



Chapter 2
The Airport Environment

THE AIRPORT ENVIRONMENT

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Learning Objectives

- Identify the difference between controlled and uncontrolled airports
- Identify how runways are numbered and how pilots choose which runway to use
- Explain what hold lines are and what their significance is
- Identify the significance of the different colored lights used at an airport and how they are activated

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Learning Objectives

- Identify two major types of fuel stored and dispensed at a typical general aviation airport
- Explain the difference between a ramp, a runway, and a taxiway
- Explain the hazards associated with fires involving hangars

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Introduction

- Two basic classifications of airports which correspond to the two classifications of aircraft as stated in Chapter 1:
 - Military Airports
 - Used almost exclusively by military aircraft
 - Civil Airports
 - Used predominately by civil aircraft, which includes commercial and general aviation aircraft

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Controlled and Uncontrolled Airports

- Controlled Airports
 - Controlled airports are airports that have an operating tower that provides direction to aircraft in the air and on the ground as well as ground vehicles on airport property
 - Control towers are tall structures that give air traffic controllers (ATC) a bird's eye view of the sky and the airport
 - Civil airports may have a control tower that operates 24 hours a day, or during certain hours, or no tower at all

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Controlled and Uncontrolled Airports



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Controlled and Uncontrolled Airports

• Uncontrolled Airports

- If there is no tower the airport is said to be "uncontrolled", most airports do not have operating control towers
- This means that before a ground vehicle or aircraft on the ground moves, drivers or pilots must watch for any vehicle moving on the ground or in the air near the airport
- Everyone should monitor the appropriate radio frequencies since the operators of aircraft and ground vehicles are supposed to transmit their position and intent when appropriate

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Controlled and Uncontrolled Airports



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Runways

- Runways are either paved or natural areas designed for aircraft landing and takeoff



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Runways

- Numbering
 - Identified by their magnetic heading alignment
- Taken from compass bearings which run from 0° to 360°
- 0° or 360° = North
- 90° = East
- 180° = South
- 270° = West
- Always drop the last number, i.e., 360° = 36

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Runways

- Approach and Departure
 - Each runway has two ends
 - Approach
 - Departure
 - Paved runways are identified with large white painted numbers

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Runways

- Two-Way Runways
 - Each landing strip has two runway designations
 - Aircraft landing on runway 23 would have an approximate magnetic heading of 230 degrees
 - Aircraft may also land on the same pavement or grass in the reciprocal direction, 180 degrees opposite
 - To determine the approximate heading of the reciprocal runway, add or subtract 180 degrees to the known runway heading

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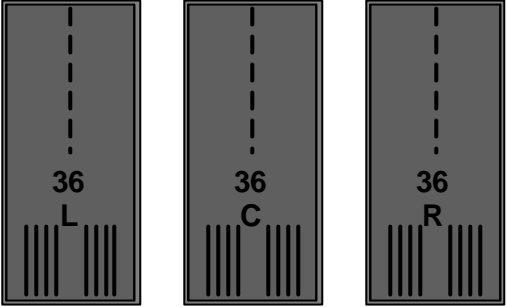
Runways

- **Parallel Runway Designations**
 - Letters distinguish between parallel runways
 - Examples:
 - 36L (36 Left)
 - 18R (18 Right)
 - Three parallels would include center runway
 - 18C (18 Center)

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Runways



The diagram shows three vertical rectangular runways. Each runway has a dashed vertical line in the center. Below the center line, the runways are labeled '36 L', '36 C', and '36 R' from left to right. At the bottom of each runway, there are several vertical bars representing taxiways or other ground features.

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Runways

- **Intersecting Runways**
 - Some airports have multiple runways that may intersect each other
 - If the airport has a tower, firefighters should request and receive permission to move onto a runway
 - Sirens don't matter!
 - If there is no tower firefighters must announce their intentions to cross or move onto a runway only after monitoring the airport frequency

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Runways

- Intersecting Runways
 - Some airports have rectangular signs identifying the runway
 - The signs will have a red background with white letters

18-36

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Runways

- Runway Use and Wind
 - Aircraft will usually try to take off or land into the wind
 - Firefighters can get an idea of the wind direction by routine methods such as smoke drift or flag position
 - When on airport property a visual indicator of wind may be a wind sock

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Taxiways

- Used to provide access to runways and other parts of the airport
- Some run parallel to the runway
- Not all airports have parallel taxiways and aircraft or ground vehicles may have to "taxi" on the runway to get to their proper position

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Taxiways

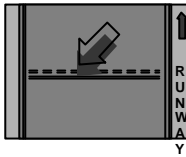

- Hold Lines
 - Taxiways are generally narrower than the runway and can be paved or unpaved
 - Paved taxiways have a single yellow line to mark it's center

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Taxiways

- Hold Lines
 - Where a taxiway intersects a runway there are four yellow lines that run perpendicular to the taxiway
 - All aircraft and ground vehicles must stop prior to the double yellow solid lines
 - There are also hold lines for taxiway intersections

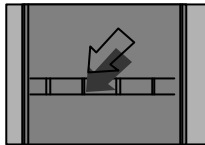



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Taxiways

- Hold Lines
 - The Instrument Landing System (ILS) hold line is used to keep aircraft and ground vehicles from interfering with navigational radio signals for approaching aircraft



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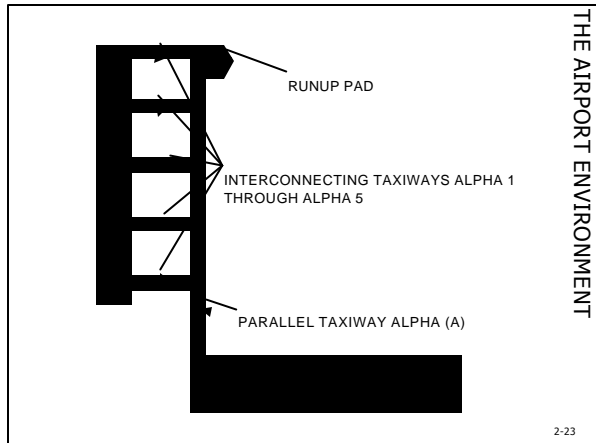
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Taxiways

- Taxiway Designators
 - Taxiways may be identified by a letter and/or numbering sequence
 - Phonetic alphabet letters are used
 - For example:
 - Taxiway "A" is Taxiway "Alpha"
 - Multiple taxiways connecting a parallel taxiway to a runway may be designated at "A1", "A2", etc.

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Taxiways

- Taxiway Designators
 - Many airports have rectangular signs showing where taxiways are and their designations
 - Sometimes they are combined with runway identification signs

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Runup Pads


- Connected to but not part of the runway
- Where the pilot performs equipment checks and runs the engine up to check aircraft systems

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Ramps

- A paved or unpaved parking area
- Sometime referred to as the "tie down" area or "apron"



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Airport Markings

- There are many markings on the pavement and on various signs at an airport
- More information can be found:
 - Aeronautical Information Manual (AIM)
 - Federal Aviation Administration Web Site
 - www.faa.gov
 - From your local airport operator

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Fixed Base Operators

- Many airports also have businesses such as flight schools, aircraft maintenance shops, restaurants, and fueling operations
- Airport based businesses that serve general aviation are known as “fixed base operators” or FBOs

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Fixed Base Operators



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Fixed Base Operators

- FBOs can provide information for firefighters to include:
 - Airport operations
 - Aircraft familiarization
- Contact your FBOs to arrange visits, most are very cooperative and provide a great deal of information that may prove helpful in case of emergencies

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Fixed Base Operators

- When performing inspections of FBOs additional reference materials can be found in the following National Fire Protection Association (NFPA) documents:
 - NFPA 407, Aircraft Fuel Servicing
 - NFPA 409, Standard for Aircraft Hangars

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Airport Fuel Storage and Dispensing

- Two type of fuel are stored at most airports
 - AVGAS (100 octane low lead) used for most aircraft with reciprocating engines
 - Jet A (kerosene blend) used for turbine engine of turboprops and jet aircraft
- Aircraft can be fueled from either stationary or mobile fuel tanks
- Most airports do not have self service fuel pumps

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Airport Fuel Storage and Dispensing



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Airport Fuel Storage and Dispensing

- **AVGAS (100LL)**
 - Vapors are heavier than air
 - Flashpoint: -50°F
 - Ignition Temperature: 824°F
 - Flammable Limits: LEL 1.2%; UEL 7.1%
 - Extinguishing Methods, dry chemical, foam, carbon dioxide
 - Appearance: light blue liquid

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Airport Fuel Storage and Dispensing


- **Jet A**
 - Flashpoint: 140°F
 - Ignition Temperature: 475°F
 - Flammable Limits: LEL 0.6%; UEL 4.6%
 - Extinguishing Methods, dry chemical, foam, carbon dioxide
 - Appearance: clear

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Airport Fuel Storage and Dispensing

- **Bonding**
 - A process of connecting a wire or strap between a fuel distribution source and the aircraft or other vehicle being fueled



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Airport Fuel Storage and Dispensing

- Stationary Fuel Storage
 - Fuel storage in underground or aboveground tanks
 - Firefighters should determine:
 - Storage capacities
 - Emergency shutoff locations and operation
 - Diking arrangements
 - Large, clearly marked signs that show emergency shutoffs are required

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Airport Fuel Storage and Dispensing

- Mobile Fuel Storage
 - Tankers can range in capacity from a few hundred gallons to thousands of gallons
 - There are many configurations of fuel tankers
 - Regulations such as NFPA 407 cover use and storage of such tankers such as parking, presence of an operator, and bonding
 - Mobile tankers must have emergency fuel shutoff devices that are colored red and plainly marked

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Airport Fuel Storage and Dispensing



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Airport Fuel Storage and Dispensing



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Airport Fuel Storage and Dispensing



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Hangars

- Large structures where aircraft are stored and maintained
- Common construction consists of block or corrugated metal siding
- The roof can consist of wood or metal decking and is supported by wood or metal trusses (including bowstring) to insure the maximum amount of floor space

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Hangars



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Hangars



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Hangars

- Firefighters not already familiar with the hazards of truss construction should study references due to the dangers of fire on them
- Truss construction plus the high fuel loads found in aircraft hangars may produce extremely dangerous conditions

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Hangars

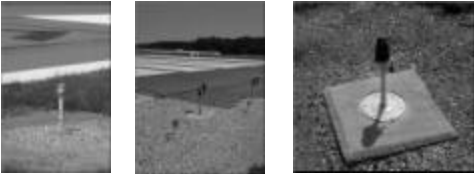


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Airport Lighting

- The airport at night appears different than during the day
- Each type light has a specific purpose
- Different colored lights have different meaning



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Airport Lighting

- Rotating Beacon
 - All civil airports have a revolving green and white light
 - The beacon may be on during bad weather, even during daylight hours
 - Heliports have a rotating beacon that flashes green, yellow and white

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Airport Lighting



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Airport Lighting

- Runway End Identifier Lights (REIL)
 - Two flashing white lights at the approach end of a runway
 - These lights allow pilots to pick the beginning of the runway out of all the lights at the airport
 - It is important not to block these lights with fire equipment

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Airport Lighting

- Runway Lighting
 - Identified by a row of small white lights low to the ground on each side of its length
 - Some runways may have amber lights in place along the last part of the runway to caution the pilot and red lights across the end
 - Taxiways are marked with blue lights along the edges

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Airport Lighting

- **Pilot-Controlled Lighting**
 - Airport lights are usually controlled by the person in the control tower
 - If the tower is closed or there is no tower the airport may have Pilot Controlled Lighting (PCL)
 - When this system is in place, the pilot uses microphone clicks on a designated frequency to activate the lights
 - Fire companies with access to an airport radio may activate the airport lights in the same manor

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Airport Lighting

- **Visual Glide Slope Indicators**
 - Some airports have banks of red and white lights (as seen from the air) beside the approach end of the runway
 - When on final approach to land pilots often view these lights which indicate correct height and decent angle
 - It is important not to block these lights with emergency vehicles

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Airport Lighting

- Firefighters should tour their local airport at night because seeing the lighting configurations will help firefighters to relate and remember what those lights mean

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Summary

- Some airports have ARFF on the property
- Anyone who respond to airports, like mutual aid providers need basic training to operate at airports
- Be familiar with the airport and it's components
- Be aware of fixed base operations
- Know construction dangers of hangars
- Know airport light colors and systems

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