
UNIT 5 – MALFUNCTION PROCEDURES

RAM-AIR PARACHUTE
TRAINING MANUAL

BLM SMOKEJUMPERS

CHAPTER 5 - MALFUNCTION PROCEDURES

This chapter introduces student to possible malfunctions and proper emergency procedures. This unit is broken down into 6 lessons: Ram-Air Malfunction Procedures, Types of Malfunctions, Malfunction Simulator Training, Jump Tower Performance Standard, Tower Introduction, and Tower Jumps.

CHAPTER OBJECTIVES

At the completion of this unit the students must:

1. Demonstrate verbally and physically the four-point check and describe when it must be performed.
2. Demonstrate verbally and physically with proper timing the Ram-Air Jump Count.
3. Demonstrate verbally and physically the after canopy opening check.
4. Demonstrate verbally and physically the proper emergency procedures in the case of a malfunction that cannot be cleared.
5. Identify and describe verbally the four primary Ram-Air malfunctions as given or as shown on video.
6. Demonstrate verbally and physically the appropriate corrective action needed for any given primary malfunction.
7. Identify and describe verbally the nine special situations that may occur during a jump. These may be given or shown on video.
8. Describe verbally the appropriate corrective action needed for any given special situation.
9. Accurately, and without hesitation, recognize and identify all malfunctions given (or shown), and accurately describe and perform the appropriate malfunction procedures.
10. Accurately list verbally the three categories of the jump tower evaluation criteria and identify the instructor responses associated with each evaluation.
11. Perform at least 4 actual training tower jumps with a category (1) evaluation. This will include the performance of proper aircraft, exit, and malfunction procedures.

EQUIPMENT NEEDS

- 1ea. - DVD "Malfunctions--Emergency Procedures", monitor/DVD PLAYER
 - 1ea. - Malfunction Training Simulator - (MTV) and associated DVD
 - 1ea. - Copy of Tower Performance Standards for each student.
 - 1ea. - Jumper Training tower.
 - 1-2ea. - Spotter harness in tower with tether.
 - 1-3ea. - Risers for the trolley.
 - 5-6ea. - Haul-back ropes.
 - 4-5ea. - Dummy Reserves.
 - 1ea. - Bullhorn (check batteries)
 - 1ea. - Evaluation sheet. 1ea. X # of students
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lesson I **RAM-AIR MALFUNCTION EMERGENCY PROCEDURES**

LESSON OBJECTIVE:

At the completion of this Lesson, the students must:

- **Demonstrate verbally and physically the proper emergency procedures in the case of a malfunction that can not be cleared.**

EQUIPMENT NEEDS: none

Optional: have one jumper fully suited up for demonstration

Every jumper should review malfunction procedures often--at least before every jump. The jumper should go through his jump count, look up at an imaginary canopy, envision a malfunction, and then run through the appropriate responses to the malfunction. Each malfunction scenario should be reviewed this way, as should the procedures for checking a good canopy. This exercise requires concentration and diligence; it should not be just a cursory afterthought.

EMERGENCY PROCEDURE (same for every malfunction that can't be cleared)

THROW AWAY DROGUE HANDLE VIGOROUSLY, LEFT HAND ON HIP, FEET TOGETHER, HEAD DOWN.

1. **LOOK** AT MAIN RELEASE HANDLE.
2. **REACH** AND GRAB MAIN RELEASE HANDLE.
3. **PULL** MAIN RELEASE HANDLE, THROW IT AWAY.
4. **LOOK** AT RESERVE HANDLE.
5. **REACH** AND GRAB MAIN RELEASE HANDLE.
6. **PULL** RESERVE HANDLE, THROW IT AWAY.

Another way to think of the malfunction procedure is by the three-step process, **LOOK, REACH, PULL**. When the decision has been made to cut away a malfunctioning main, the jumper must **LOOK** at the main release handle, **REACH** for it, then **PULL** it. The jumper then must **LOOK** at the reserve handle, **REACH** for it, and **PULL** it.

The same emergency procedure is used for all the malfunctions we may encounter. **Once the decision to go to the emergency procedure has been made, attention should be focused on the chest/reserve area, where all the handles are located.**

Lesson II TYPES OF MALFUNCTIONS

Students will be introduced to possible Ram-Air parachute malfunctions. They will also be shown the video on Ram-Air Parachute Emergency Procedures.

LESSON OBJECTIVE:

At the completion of this Lesson, the students must:

- Describe verbally the four primary Ram-Air malfunctions.
- Demonstrate verbally and physically the appropriate corrective action needed for any given primary malfunction.
- Describe verbally the nine special situations that may occur during a jump.
- Describe verbally the appropriate corrective action needed for any given special situation.

EQUIPMENT NEEDS:

1ea. - DVD "Ram-Air Parachute Emergency Procedures" and monitor/DVD PLAYER.

I. PRIMARY MALFUNCTIONS

There are four primary malfunctions:

- 1) Drogue-in-tow
- 2) Streamer
- 3) Spinning
- 4) Horseshoe

1. **DROGUE-IN-TOW MALFUNCTIONS.** The "drogue-in-tow" malfunction encompasses everything from no drogue deployment to a parachute bag-lock.

A. Drogue did not deploy.

Cause

- jumper forgot to hook up
- cable broke
- weak link broke

Corrective action

- initiate a vigorous check for canopy, "Check with vigor". A vigorous look back bumps the drogue 3-ring with the back of the helmet and

changes the geometry of the harness near the drogue 3-ring if the drogue is present. If the drogue does not release following the "Check with vigor", emergency procedures are initiated. Note this corrective action would be ineffective for this type of DIT malfunction but would still allow sufficient altitude for reserve deployment. The corrective action is specified for this type of DIT malfunction to keep procedures consistent for all DIT malfunctions. Consistent procedures reduce malfunction identification decision points and result in better performance in high stress situations.

B. Drogue in tow - Drogue deployed but did not release.

Cause

- 3-rings not hooked up correctly
- swedge came loose on drogue release handle
- drogue bridle broke
- improper alignment of drogue 3-ring
- freezing of wet components of drogue 3-ring assembly
- debris in drogue 3-ring assembly

Corrective action

- initiate a vigorous check for canopy, "Check with vigor". A vigorous look back bumps the drogue 3-ring with the back of the helmet and changes the geometry of the harness near the drogue 3-ring. If the drogue does not release following the "Check with vigor", emergency procedures are initiated.

C. Bag-lock - Lines deployed but canopy remains in D-bag.

Cause

- rigging error

Corrective Action:

- initiate a vigorous check for canopy, "Check with vigor". If the bag-lock does not release following the "Check with vigor", emergency procedures are initiated. Note this corrective action would likely be ineffective for this type of DIT malfunction but would still allow sufficient altitude for reserve deployment. The corrective action is specified for this type of DIT malfunction to keep procedures consistent for all DIT malfunctions. Consistent procedures reduce malfunction identification decision points and results in better performance in high stress situations.

2. **STREAMER MALFUNCTION.** The drogue has been released; canopy is above the jumper but will not inflate.

Cause

- hung slider
- tangled lines
- line-over
- opening damage
- material failure

Corrective action

- Grab the toggles and pump them deliberately three times all the way down. This should inflate the canopy. If not, initiate emergency procedures.

3. **SPINNING MALFUNCTIONS.** A spinning malfunction is a partially or fully open canopy that goes into a turn after opening. For a spinning malfunction caused by broken lines, it is important that you evaluate whether the canopy can be controlled before you cut away the main. If the main canopy is not controllable (does not pass the control check), it is time to get rid of it and deploy a parachute you can land.

A. Rapid spinning - rapid turn rate with a rapid descent rate.

Cause

- riser released
- lines tangled
- broken lines

Corrective action

- Grab the toggles and pump three times all the way down. If the spin does not stop; initiate emergency procedures.

B. Broken brake line - canopy will be in a slow turn.

Cause

- brake line broke on opening

Corrective action

- Release the other brake line, let it up, and then steer with your risers. Turn with your front or rear risers, flare with your rear risers.

C. Released brake line

Cause

- brakes stowed incorrectly
- hard opening

Corrective action

- Stop the spin by releasing the other brake. Steer with the brake lines or rear risers. If you can't reach the toggles, steer with your risers.

4. **HORSESHOE MALFUNCTION.** A horseshoe malfunction would occur if the drogue deployed and became wrapped around part of your body, then the main tried to deploy with the drogue still attached to you. Because you are attached to the parachute by your risers, if another part of the parachute assembly, such as the drogue, has stuck to you, the resulting mess would resemble a horseshoe shape.

A. Horseshoed canopy

Cause

- poor exit

Corrective action

- Drop your drogue release handle, slap (or brush) at the drogue three times to try to clear the drogue from your body. If it doesn't clear, initiate emergency procedures. *(It is acceptable to slap or brush the drogue while performing the jump count but it is critical that the drogue release handle is pulled at the end of the jump count regardless of drogue location.)*

II. SPECIAL SITUATIONS

A number of special situations can occur that, although rare, you need to be prepared to deal with. These include lost handles, collisions, two canopies, released three-rings, line twists, and end cell closure, drogue over the nose, twisted risers, and canopy damage.

1. **LOST HANDLE.** A lost handle malfunction would occur if the jumper was unable to locate the drogue release handle after exiting the aircraft.

Causes

- loose or unhooked leg strap
- jacket material covering handle

- handle came out of keeper and is floating
- jumper focuses on another part of harness

Corrective action

- Continue count to a total of three "pull thousands," making three attempts to find and pull your drogue release handle. With each additional "pull thousand," look for and attempt to pull the drogue release handle. If you cannot find it by the third "pull thousand," initiate emergency procedure.

2. **COLLISIONS.** One of the most dangerous situations a jumper can encounter is a midair collision with another jumper. A collision between jumpers can result in both jumpers becoming entangled, loss of steering control and possible collapse of canopies. Prevent this by always being aware of your airspace, knowing where other jumpers are at all times.

A. Jumpers opening up close to one another

Cause

- spotter error
- jumper in latter stick has a malfunction

Corrective action

- check airspace and initiate a right turn
- yell at other jumper to make sure he knows your location
- one jumper gains vertical separation

B. Jumpers are facing each other and closing

Cause

- unawareness of airspace
- canopies open facing one another

Corrective action

- Make a right turn by grabbing anything on the right side that will turn you: a steering toggle, a front riser, or a rear riser.
- Establish verbal communication.

C. Inevitable collision

Cause

- jumper error

Corrective action

- Extend your arms and legs to avoid passing through lines. Communicate with your jump partner. If there is sufficient altitude, the lower jumper could cut away by pulling the main release handle and then pulling the reserve handle. At lower altitudes, cutting away is not an option. Don't do anything that will worsen the situation. Do the best PLF you have ever done.

3. TWO CANOPIES. The main and reserve are both deployed.

A. Main and reserve are fully inflated.

Cause

- inadvertent reserve opening
- out of sequence emergency procedure
- pulling the RSL lanyard and the drogue release handle simultaneously

Corrective action

- Ensure parachutes are not tangled, release upper RSL then cut away the main canopy by pulling the main release handle.
- If canopies are tangled then fly both canopies to the ground. Steer with dominant canopy (usually the main) utilizing gentle toggle movements. Do not un-stow brakes on 2nd canopy or perform a flared landing. Land at ½ brakes.

B. Main inflated, reserve starting to deploy

Cause

- inadvertent reserve opening

Corrective action

- Stop deployment by grabbing the free bag, stop the deployment and stow it in a manner to ensure that it will not entangle with you if it starts to inflate. If the reserve is partially inflated, you can aid the deployment by shaking the risers.

4. RELEASED 3-RING. The inadvertent release of a riser 3-ring parachute attachment would put the canopy in an uncontrollable spin.

Cause

- improper hookup of the 3-ring
- broken nylon ring locking loop

Corrective action

- Initiate emergency procedures.

5. LINE TWISTS. The main canopy is open, but the lines are twisted together.

Cause

- drogue release pulled before jumper is stable
- rigger error

Corrective action

- Kick feet, grab the risers and pull them apart. Do not release the brakes until untwisted. Yell at jump partner to inform him of your twists.
- A jumper can be twisted so much it can be considered a malfunction.
- See how well the canopy is inflated. If the slider is below the cascade points, the canopy can be landed safely, but steering will be impossible until the canopy untwists.
- If the slider is below the cascade points, it is highly unlikely that the canopy would be twisted enough to be considered a malfunction.

6. END CELL CLOSURE. The canopy is inflated except for the end cells. The canopy will fly just fine in this condition.

Cause

- things happen
- turbulence

Corrective action

- Not a malfunction. Simply pump the toggles to re-inflate.
- Turbulence may induce end cell closures. Fly at 1/2 brakes to overcome this problem.

7. DROGUE OVER THE NOSE. Occasionally the drogue will drape itself over the nose of the canopy.

Cause

- prolonged stall

Corrective action

- Confirm that the drogue is not affecting control and ignore it.

8. **TWISTED RISERS.** The canopy is fully inflated and oriented correctly. One or both risers have a full twist in them.

Cause

- rigger error
- jumper hooked up canopy with risers twisted

Corrective action

- Confirm that the twist(s) is not affecting control. There will be more pressure on the toggles but steering should not be a problem.

9. **RIPS AND TEARS.** Some of the canopy nylon has been damaged on opening. The ram-air can sustain significant damage and still be controllable.

Cause

- rigger error
- hard opening

Corrective action

- Determine canopy controllability. If the canopy cannot be landed safely, initiate the emergency procedures. If the canopy can be landed safely, avoid radical maneuvers and land at half-brakes.

SUMMARY

The same emergency procedure is used for all of the malfunctions that may be encountered. The decision to get rid of a canopy you cannot land should be made promptly. If a jumper has doubts about the airworthiness of his main canopy, he should opt to get above him a good parachute, the reserve. Once the decision to go to the emergency procedure has been made, **focus attention on the chest/reserve area and carry out the emergency procedures**

Lesson III.

VIDEO/SCRIPT “RAM-AIR PARACHUTE EMERGENCY PROCEDURES”

1. SHOW THE VIDEO:

Instructor Notes: It is advisable to stop the video after each procedure, demonstrate it and talk about it. Have the students perform the procedures several times before moving on to the next. Even with a small class it is necessary to have multiple instructors watching the students in order to see mistakes and assist the lead instructor as he sees fit.

2. UPON COMPLETION OF THE VIDEO; INSTRUCTOR SHOULD THEN REVIEW THE MALFUNCTIONS AGAIN, BRIEFLY DESCRIBING EACH PROBLEM AND EMPHASIZING THE APPROPRIATE RESPONSE TO EACH.

The following is the script from the video on Ram-Air parachute emergency procedures. Students should use this as a reference for study and discussion.

RAM-AIR PARACHUTE EMERGENCY PROCEDURES (video script)

The following tape describes an important moment of a parachute jump: the opening of the parachute.

Please give me your undivided attention as you **MUST** learn and remember this information.

This tape will cover in detail procedures to follow after experiencing a good main canopy.

Then we will review the procedures to perform should you encounter any of the following malfunctions:

The drogue-in-tow malfunction; the streamer; the spinning malfunction; and the horseshoe.

Each malfunction will be described, possible causes of each malfunction will be discussed and corrective actions for each instance will be given.

Also to be covered are special situations dealing with miscellaneous problems you may encounter.

After viewing this tape, you should be able to identify any parachute deployment problem and take the appropriate action to correct it.

Also, it is essential that you become thoroughly familiar with your parachute gear and properly maintain it throughout the fire season.

You should develop a complete understanding of how every component on your harness works.

This, in turn, will help give you an understanding of the parachute deployment sequence and add to your awareness of potential problems.

Part One: a Good Canopy

The spotter will ask you: "**Are you ready?**"
"**Are your leg straps tight?**"

You answer for your stick: "**Yes, we are ready.**"

The spotter will say: "**Get in the door.**"

The first jumper gets in the door.

This is your cue to do a four-point check. Everyone in the stick does a four-point check.

The spotter will say, "**We're turning final at 3,000 feet, your static line is clear.**"

The spotter will say: "**Get ready**" and then give you a slap-to-go signal on your left shoulder.

Your count is **JUMP THOUSAND, LOOK THOUSAND, REACH THOUSAND, WAIT THOUSAND, PULL THOUSAND.**

Jump Thousand: You push yourself out

the door of the airplane

Look Thousand: You focus your attention on the drogue release handle. You consciously look at the handle.

Reach Thousand: You reach for the drogue release handle.

Wait Thousand: You wait for one count to insure the proper time frame so you will have a stable body position.

Pull Thousand: You pull the drogue release handle. The drogue parachute is released and the main parachute deploys.

Check your canopy: After the opening shock, you look up to make an immediate assessment of the condition of the parachute.

Check your airspace: You scan the area in front of you to insure that you are clear from your jump partner or partners. You keep searching until they are located. You also reach up and grasp your steering toggles.

Check your controls: make a right turn, a left turn, and stall the canopy. This is a controllability check to insure there is no hidden damage to the canopy that would show up later when you are maneuvering.

You are proving to yourself the canopy is functioning properly.

The quick turns to the left and right are useful to continue to locate and keep track of your jump partner or partners. Then you continue with the jump.

Part Two: The Four Primary

Malfunctions

- **DROGUE-IN-TOW**
- **STREAMER**
- **SPINNING**
- **HORSESHOE**

In this part, we will discuss the four primary types of malfunctions that can occur and the procedures for correcting the problems.

With any type of parachute malfunction, it is important to attempt to identify what is happening so that you can properly react.

You will notice in this segment that after identifying and attempting to correct the problem within a specific time frame, there is a simple, standard procedure for deploying the reserve parachute.

DROGUE-IN-TOW: The "drogue-in-tow" malfunction encompasses everything from no drogue deployment to a parachute bag lock.

After exiting the aircraft, doing your count and pulling your drogue release handle, if you don't see any part of the main canopy deploying, it is a drogue-in-tow.

You may be riding stable under the drogue or you may be tumbling.

You may or may not be able to see your drogue parachute deployed above you in this situation.

Some causes of a drogue-in-tow: You did not hook up.

The weak link, the static line or the drogue

bridle broke.

The 3-ring attachment did not release when you pulled your drogue release handle.

The main parachute is locked in the deployment bag.

The corrective action to take for a drogue-in-tow:

“Check with vigor” The bumping action may dislodge a locked 3-ring. If the main canopy does not begin to deploy initiate emergency procedures.

Throw away the drogue release handle. This avoids getting the cable entangled.

Place your left hand on your hip. This keeps your left hand out of the way of the reserve deployment.

Pull your main-release handle and throw it away. This releases the main parachute risers from your parachute harness by releasing the three rings.

Pull your reserve handle. This activates your reserve parachute.

In each instance, you need to be looking directly at the handle you are going to pull.

You need to focus your attention on the area that is going to save your life.

And that area is right here. (video of handle area)

Once you have determined that you have a

malfunction, you bring all of your attention to this space.

You will look at each handle before you pull it, rather than groping around trying to find it by feel.

You can break down the elements of pulling the handle even further.

The proper procedure for pulling any handle is look, reach, pull.

Throw away any handle before you pull the next one.

Look, reach, pull.

Let's take a moment to explain the role of the RSL system.

Basically, the RSL is a line attached from the riser of the main parachute to the handle of the reserve parachute.

By pulling the main-release, you are releasing your left and right 3-ring riser attachments and thereby cutting away the malfunctioning main parachute.

If the main parachute has sufficient drag from being partially deployed, then the line from the RSL feeds out and pulls your reserve handle for you as the main flies away.

You won't have time to pull the reserve handle before your RSL automatically pulls it for you.

But since there are some instances where the main is not inflated or even partially deployed, such as the drogue-in-tow

malfunction, the procedure is for you to also manually pull your reserve handle.

To review the procedure for a drogue-in-tow:

You've pulled your drogue release handle, you look up and nothing is happening, nothing is up there:

You throw away your drogue release handle.

Left hand on your hip.

You pull your main-release release handle (look, reach, pull).

Throw it away.

You pull your reserve handle (look, reach, pull).

STREAMER: The next category of malfunction to consider is the streamer.

A streamer is any main parachute malfunction where the canopy is out of the deployment bag, but is not inflating properly.

The lines are stretched out, but the canopy is not opening.

The slider is not descending down the lines; it is hung up near the skirt of the canopy.

The term streamer is used, as this video shows, because the canopy material is fluttering in the wind stream and is not inflating and you are streaming to earth at a fast rate.

A hung slider is a variation of a streamer where some air is inflating the canopy, but the slider is stuck and not descending down the lines to allow full opening of the canopy.

A streamer can be caused by rigging error.

A streamer can occur with no known explanation.

A streamer may just be a bad "snivel" with the canopy taking extra time to open.

What may appear to be a streamer may just be a normal or slow opening but the jumpers internal reaction time has been accelerated by the adrenalin of the jump.

The corrective action for a streamer type of malfunction is:

Three pumps and a dump.

This refers to three "pumps" on the steering toggles (the toggles are brought all the way down and all the way up in succession), then a "dump" (or cutaway of the malfunctioning main canopy) if it doesn't clear.

If the canopy does not clear, throw away the drogue release handle.

Left hand on your hip.

Pull your main-release handle. (Look, reach, pull.)

Pull your reserve handle. (Look, reach, pull.)

Keep in mind the procedure starts the same

for a full-fledged streamer as for a more moderate hung slider.

You are looking up at the canopy and doing three pumps. One, two, three.

The hung slider is very likely to come down, and if it does, continue your opening checks: **CHECK YOUR CANOPY, CHECK YOUR AIRSPACE.**

If it doesn't clear, if you can't make your canopy controllable, throw away your drogue release handle, left hand on hip, pull your main-release handle (look, reach, pull), pull your reserve (look, reach, pull).

The three pumps is a procedure to help inflate the canopy and it provides a working time frame for you to get things done.

If you don't have a canopy above you that you want to land by the time you have performed three pumps, it is time to initiate the emergency procedure.

Look, reach, pull; Look, reach, pull.

SPINNING: A spinning malfunction is a partially or fully open canopy that goes into a rapid turn after opening.

The rapid turn rate also produces a rapid descent rate as the canopy spirals, so the canopy cannot be landed safely in this condition.

Causes of a spinning malfunction include experiencing broken lines during deployment, getting a pressure knot in the lines or getting a line (or lines) over the canopy.

It is important to evaluate the severity of the problem before you initiate the emergency procedure.

The procedure for a spinning canopy that is not controllable is the same as for a streamer: three pumps and a dump.

Pump one, two, three. If it doesn't clear, throw away your drogue release handle, left hand on hip, pull your main release handle, pull your reserve handle.

The pumping action again establishes a time frame for you to work on the malfunction and gives you a chance to correct the problem.

If the spin is being caused by a pressure knot, the knot may come undone if you can relieve enough of the tension on the knot.

Therefore, it may be useful to rapidly throw your hands up on the up-stroke of your pump, rather than maintaining constant pressure with a slow up-stroke.

You should be looking up at the canopy while you are doing your three pumps, and check to see if you are making any progress.

In the case of line-over, the pumping action may help to work lines off of the canopy. As with a streamer malfunction, if your main canopy is not controllable after three pumps, it is time to get rid of it and deploy a parachute you are going to land.

For a spinning canopy caused by broken lines, it is important that you evaluate whether the canopy can be controlled before

you cut away the main.

For example, if a steering line has broken on opening, the canopy can still be controlled.

You can release the other steering line, let it up, and then steer with your risers.

Turning can be best accomplished by using your front risers, and the rear risers can also be used to turn.

Flaring for landing can be done by using the rear risers.

Maneuvering with risers should be practiced during a proficiency jump so you will be familiar with the technique.

HORSESHOE: A horseshoe malfunction would occur if the drogue had deployed and became stuck to your body, then the main tried to deploy with the drogue still attached to you.

If the drogue stays attached to you after you have pulled your drogue release handle and the main parachute tries to deploy, the result would be a horseshoe malfunction.

Since you are attached to the parachute by your risers, if another part of the parachute assembly, such as the drogue, has stuck to you, the resulting mess would resemble a horseshoe shape.

A horseshoed canopy could result from an extremely bad exit from the aircraft causing the drogue to entangle with your body.

In the event of a horseshoe malfunction, you

FIRST drop your drogue release handle, make three slaps (or brushes) with your hand at the parachute to attempt to clear it from your body.

If it doesn't clear, initiate the emergency procedure: left hand on your hip, (look, reach, pull), pull your reserve handle (look, reach, pull).

You should maintain your normal count (Jump thousand, look thousand, reach thousand, wait thousand, pull thousand) and not attempt to clear a severely entangled drogue before you pull your drogue release handle.

The drogue might clear itself as the main deploys.

Your time frame is better maintained with the three slaps **AFTER** you pull.

It is important to practice and maintain tight body position during the exit: hands in tight to body, feet together.

If you have a tight body position, it is extremely unlikely to have the drogue entangled. Tips on exits will be outlined in another video.

You have probably noticed in these four primary types of malfunctions, the basic steps for activating the reserve are the same: left hand on hip, pull main-release, pull reserve handle.

This is intended to standardize the procedure to make it simpler to react to any situation. Pulling your reserve handle may be impossible if the RSL has already fired it for

you.

But the procedure will be for you to attempt to pull the reserve handle anyway.

Don't be surprised if the reserve handle is already gone.

Part Three: Special Situations

We will now cover some rare situations which nonetheless are required to be stored in your subconscious repertoire of corrective action.

LOST HANDLE: A lost handle malfunction would occur when the jumper was unable to locate the drogue release handle after exiting the aircraft.

A loose or unhooked leg strap could cause the parachute harness to ride up, causing the handle to be higher up than usual.

The handle could have gotten tucked in the jump coat material.

The handle could have been knocked out of its keeper and it is floating freely.

Perhaps your eyes are not focused on the handle and you are mistakenly pulling on the webbing of the harness.

For whatever reason, you can't find the handle.

Corrective action: the procedure is to continue your count to a total of three pull thousands, making three full attempts to find and pull your drogue release handle.

So the count would be: **JUMP THOUSAND, LOOK THOUSAND, REACH THOUSAND, WAIT THOUSAND, PULL THOUSAND, PULL THOUSAND, PULL THOUSAND.**

With each additional pull thousand, you are looking for and attempting to pull the drogue release handle.

Remember to physically focus your eyes on this area where the handle should be, each **PULL THOUSAND** should also involve a new attempt to look.

Also, the handle will have to be in this vicinity near the chest strap. It may help you to follow the chest strap to the handle.

If you cannot find it by the third pull thousand, it is time to initiate the emergency procedure: left hand on hip, pull your main-release (look, reach, pull), pull your reserve handle (look, reach, pull).

The three "pull thousands" establishes the time frame for you to perform the task of finding and pulling your handle.

COLLISIONS: One of the most dangerous situations a jumper can encounter is a mid-air collision with another jumper.

A collision between jumpers can result in both jumpers becoming entangled, loss of steering control and possible collapse of canopies.

Jumpers being unaware of the location of their jump partners is the cause of collisions.

Of particular concern is immediately after

opening; remember to **CHECK YOUR AIRSPACE.**

If both jumpers are facing each other and closing, the procedure for canopy collision avoidance is for both jumpers to make a right turn.

To make a quick right turn, grab anything on the right side that will turn you: a steering toggle, a right front riser or a right rear riser.

If the collision is inevitable, extend your arms and legs to avoid passing through lines.

If you do become entangled, it is essential to communicate with each other.

If there is sufficient altitude, the lower jumper could cutaway by pulling the main-release handle and then pulling the reserve handle.

At a lower level, cutting away is not an option.

A lower level collision could be caused by jumpers being unaware of location of jump partners or crowding each other as the final approach into a tight spot is made. Avoid becoming fixated on the jump spot.

Beware of days when there is no wind, allowing jumpers to make a final approach from any angle.

Know where your jump partner is at all times.

Practice vertical separation techniques such as stalls and spiral turns to get separation.

Following your J.P. is an effective way to avoid collisions.

Use the same plan; fly the same pattern as your J.P., with the upper jumper maintaining a safe distance above and behind.

TWO CANOPIES: Your main and reserve parachute are both deployed.

This could be caused by an inadvertent reserve opening, performing an out-of-sequence emergency procedure or by accidentally pulling the RSL lanyard and the drogue release handle at the same time.

Corrective action: Make sure the reserve is fully inflated and not tangled, then cutaway the main using the main- release handle.

Also, if the reserve is just starting to deploy, you may be able to grab it, stop the deployment and stow it between your legs.

If you have an inflated main parachute, the reserve would probably deploy slowly enough for you to bundle it in if you act quickly.

RELEASED 3-RING: The inadvertent release of a riser 3-ring parachute attachment would cause the canopy to be in an uncontrollable spin.

It could be caused by an improper hookup of the 3-ring, or a broken nylon ring locking loop.

Corrective action: Throw away drogue release handle, left hand on hip, pull your main- release handle (look, reach, pull), pull your reserve handle (look, reach,

pull).

RIPS AND TEARS: Some of the nylon material of the canopy has been damaged on opening.

This could be caused by a rigging error or a hard opening.

Corrective action: Assess the damage during opening check (**CHECK YOUR CANOPY**), check your controllability (**RIGHT TURN, LEFT TURN, STALL CHECK**) and determine your rate of descent.

The ram-air canopy can sustain significant damage and still be controllable.

But if you do not have a canopy you want to land with because of unsafe performance, initiate the emergency procedure promptly: throw away your drogue release handle, left hand on hip, pull your main-release (look, reach, pull), pull your reserve handle (look, reach, pull).

TWISTS: The main canopy is open, but the lines are twisted together. The lines can be twisted above or below the slider, for different reasons.

Twists can be caused by the D-bag or the jumper spinning during deployment or uneven line tension during opening.

Corrective action: Pull your risers apart and use scissor kick or hula-hoop action to accelerate unwinding.

Do not touch any toggles until the line twists are clear.

DROGUE OVER THE NOSE: In some instances, the drogue parachute may be draped over the nose of the canopy. This can happen after performing a prolonged stall.

Determine that it is not affecting controllability and, otherwise, ignore it.

END CELL CLOSURE: the canopy is completely inflated except for the front corners.

The canopy will fly just fine in this condition and is easily fully inflated with a pump of the toggles.

SUMMARY

This concludes this portion of your training review on parachute malfunctions and emergency procedures.

Additional work on recognizing and responding to these situations will be practiced in a drill video and further instruction will occur during the jump tower phase of parachute training.

During the fire season, make it a practice to mentally review the four primary types of malfunctions as you are in the airplane climbing toward jump altitude.

Then concentrate on making a good exit from the airplane and doing your count.

The work, practice and attention you give will pay off in these emergency procedures being performed automatically and decisively should the need arise.

Lesson IV MALFUNCTION SIMULATOR TRAINING

The Malfunction Simulator (the Mueller-ator or MTV) is used to reinforce malfunction identification and the execution of proper emergency procedures.

LESSON OBJECTIVE:

- **At the completion of this Lesson, the students must accurately, and without hesitation, recognize and identify all malfunctions given (or shown), and accurately describe and perform the appropriate procedures.**

EQUIPMENT NEEDS:

1ea. - Malfunction Simulator (MTV) and associated DVD.

The malfunction simulator involves one-on-one interactive video, with the student responding to a variety of parachute deployment scenarios with an instructor evaluating student responses. This exercise may be given as part of classroom training or practiced during units training.

THE INSTRUCTOR SHOULD RUN THE STUDENT THROUGH THE SIMULATOR UNTIL THE STUDENT FLAWLESSLY MEETS THE ABOVE OBJECTIVE.

Lesson V JUMP TOWER PERFORMANCE STANDARD

Students will be given and explained the performance criteria used in evaluating their tower training jumps.

LESSON OBJECTIVE:

At the completion of this Lesson, the students must verbally list the five categories of the jump evaluation criteria and identify the instructor responses associated with each evaluation.

EQUIPMENT NEEDS:

1 ea. – copy of the jump evaluation criteria for each student.

During training jumps and computerized simulated jumps, the lead parachute instructor will evaluate exit, pattern, and landing using these five ratings:

- (5) **Exceptional-** The exit, pattern and landing are all preformed in a flawless manner exceeding set performance standards under challenging wind and/or terrain conditions. Accuracy is excellent and jump objectives are met.
- (4) **Superior-** Exit consists of a tight body position and accurate jump count. Pattern is performed maximizing jumper safety and providing the best chance for overall jump success. Final approach and landing are both safe and well executed. Accuracy is good and jump objectives are met.
- (3) **Fully Successful-** The individual utilized good parachute handling techniques, i.e. performed necessary procedures and maneuver, and a good landing. Accuracy is acceptable and jump objectives are met.
- (2) **Minimally Successful--**the individual erred in one or more areas (exit, pattern or landing). i.e. pulled drogue release early; had to fly to alternate spot due to poor parachute manipulation, but salvaged the jump with a good landing; failed to get vertical separation from JP; cut off JP on final; poor PLF; hard landing induced by improper controls. Jump objectives not met.
- (1) **Unsatisfactory--** Standard procedures disobeyed which resulted in a serious problem or potential problem, i.e. collision or near collision with JP; failed emergency procedures during malfunction; severe downwind landing; landing so far off the spot that it becomes a hazard; low radical turns; forced or intended stand-up landing, stalling or sink during landing.

Jump scoring criteria

Jump scoring will be assessed using an average of the scores received in the three categories identified on a standard jump critique form. The exit, pattern and landing are the three areas evaluated. Scores will be given and averaged for a jump. This overall number will be the final jump score given. However, if a score of 1 (unsatisfactory) is given in any category the entire jump score will be lowed to this level so that corrective action can be taken.

A category **3,4** or **5** evaluation will indicate solid parachuting skills and require no additional action.

A category **2** jump would precipitate one-on-one “counseling” with the individual and parachute trainer; using video review or discussion of the error, the individual would receive information on how to improve in an honest, non-confrontational setting.

A category **1** jump would be reviewed by the individual and more than one parachute trainer and the incident would be documented. A case history would be established, and, if a trend toward unacceptable jumping develops, it could be grounds for removal from the program.

Lesson VI CLASS DEMONSTRATION

Students will be introduced to the proper way to use the jumper training tower.

LESSON OBJECTIVE:

- **At the completion of this Lesson, the students must verbally identify safety concerns and proper procedures for going through the tower training.**

EQUIPMENT NEEDS:

1ea. - Jumper training tower.

SHOULD BE PRESENTED DIRECTLY PRIOR TO LESSON III - ACTUAL TOWER TRAINING.

1. Explain the objectives for the tower training and how the tower works.
2. Explain the safety rules of the tower:
3. The first jumps off the tower should be single-person sticks with the students going through the jump count and opening checks. Explain to the students that they need to finish their jump counts even if they've already reached the berm.
4. Watch for proper aircraft procedures, body position, and counts--**emphasize practicing tight body position during tower exits and even during circle-ups on the ground!**
5. The progression for tower jumps goes from single-jumper sticks, to two-jumper sticks, to malfunction procedures. How fast the student's progress through each phase of the tower training will depend on how fast the students learn each phase. By the end of the first tower session students should be performing satisfactory two-jumper sticks.

Lesson VII TOWER TRAINING

Students will perform training tower jumps. They will be evaluated based on the criteria presented in Lesson I of this unit.

Tower training reinforces what the students have already learned about proper aircraft procedures, exits, and malfunction procedures. The tower stresses a student much like an actual jump. Students **must** demonstrate competence in all aspects of tower training before graduating to actual jump training.

LESSON OBJECTIVE:

- **At the completion of this Lesson, the students must perform at least 4 actual training tower jumps with a category (1) evaluation. This will include the performance of proper aircraft, exit, and malfunction procedures.**

EQUIPMENT NEEDS:

- 1ea. - Jumper Training tower.
- 1-2ea. - Spotter harness in tower with tether.
- 1-3ea. - Risers for the trolley.
- 5-6ea. - Haul-back ropes.
- 4-5ea. - Dummy Reserves.
- 1ea. - Bullhorn (check batteries)
- 1ea. - Evaluation sheet. 1ea. X # of students

A. Malfunctions

The students must have completed classroom malfunction training and malfunction simulator training before they go to the tower.

1. Before the students begin malfunctions off the tower, review malfunction procedures on the ground.
2. Explain that when they cut away, they won't fall to the ground.
3. Tell students to finish their malfunction procedure even if they've reached berm.
4. Keep track of the malfunctions given to each student and evaluate each jump based on the criteria presented in Lesson I of this Unit.

B. What to watch for during malfunction jumps

1. The spotter on the tower watches for proper A/C procedures.
2. The evaluator should be watching for proper body position on exit, proper count, and correct response to a malfunction.
2. During emergency procedures look for proper body position: feet together? left hand on hip? looking at handles before pulling? dropping handles after pulling?
3. Talk to each student after each jump and explain what they did right or wrong.

Drogue Not Deployed or Bag Lock Time/Distance Chart				
Seconds	Ft/Sec	Distance Fallen	AGL	Action
1	16	16	2984	“Jump Thousand”
2	48	64	2936	“Look Thousand”
3	80	144	2856	“Reach Thousand”
4	112	256	2744	“Wait Thousand”
5	144	400	2600	“Pull Thousand”
6	168	568	2432	“Check your canopy”
7	176	744	2256	-Drogue in Tow identified
8	176	920	2080	“Look, Reach, Pull” Main Release Handle
9	176	1096	1904	“Look, Reach, Pull” Reserve Handle
10	176	1272	1728	
11	176	1448	1552	-Fully opened reserve
12	176	1624	1376	
13	176	1800	1200	
14	176	1976	1024	
15	176	2152	848	
16	176	2328	672	
17	176	2504	496	400' AGL is the lowest altitude that one could expect to deploy their MT1S reserve and land under a full canopy
18	176	2680	320	
19	176	2856	144	
20	176	3032	-32	
21	176	3208	-208	

*These figures are based on a freefall speed of 120 mph, approximately what a jumper would obtain without a drogue or canopy above him.

Drogue in Tow Time/Distance Chart

Seconds	Ft/Sec	Distance Fallen	AGL	Action
1	16	16	2984	“Jump Thousand”
2	48	64	2936	“Look Thousand”
3	80	144	2856	“Reach Thousand”
4	112	256	2744	“Wait Thousand”
5	138	394	2606	“Pull Thousand”
6	147	537	2463	“Check your canopy”
7	147	684	2316	-Drogue in Tow identified
8	147	831	2169	“Look, Reach, Pull” Main Release Handle
9	147	978	2022	“Look, Reach, Pull” Reserve Handle
10	147	1125	1875	
11	147	1272	1728	-Fully opened reserve
12	147	1419	1581	
13	147	1566	1434	
14	147	1713	1287	
15	147	1860	1140	
16	147	2007	993	
17	147	2154	846	
18	147	2301	699	
19	147	2448	552	
20	147	2595	405	400' AGL is the lowest altitude that one could expect to deploy their MT1S reserve and land under a full canopy
21	147	2742	258	
22	147	2889	111	
23	147	3036	-36	
24	147	3183	-183	
25	147	3330	-330	

*These figures are based on an average jumper's exit weight of 250 lbs using an average age F111 drogue. Figures correspond to a terminal fall speed of 100 mph.

Horseshoe Time/Distance Chart				
Seconds	Ft/Sec	Distance Fallen	AGL	Action
1	16	16	2984	“Jump Thousand”
2	48	64	2936	“Look Thousand”
3	80	144	2856	“Reach Thousand”
4	112	256	2744	“Wait Thousand”
5	144	400	2600	“Pull Thousand”
6	168	568	2432	“Check your canopy”
7	176	744	2256	-Horseshoe identified
8	176	920	2080	-1 st brush
9	176	1096	1904	-2 nd brush
10	176	1272	1728	-3 rd brush
11	176	1448	1552	“Look, Reach, Pull” Main Release Handle
12	176	1624	1376	“Look, Reach, Pull” Reserve Handle
13	176	1800	1200	
14	176	1976	1024	-Fully opened reserve
15	176	2152	848	
16	176	2328	672	
17	176	2504	496	400' AGL is the lowest altitude that one could expect to deploy their MTIS reserve and land under a full canopy
18	176	2680	320	
19	176	2856	144	
20	176	3032	-32	
21	176	3208	-208	

*These figures are based on a freefall speed of 120 mph, approximately what a jumper would obtain with an entangled drogue not providing significant drag.

Streamer Time/Distance Chart				
Seconds	Ft/Sec	Distance Fallen	AGL	Action
1	16	16	2984	“Jump Thousand”
2	48	64	2936	“Look Thousand”
3	80	144	2856	“Reach Thousand”
4	112	256	2744	“Wait Thousand”
5	138	394	2606	“Pull Thousand”
6	147	537	2463	“Check your canopy”
7	147	684	2316	-Streamer identified
8	147	831	2169	-Hands on toggles
9	147	978	2022	-1 st pump
10	147	1125	1875	-2 nd pump
11	147	1272	1728	-3 rd pump
12	147	1419	1581	“Look, Reach, Pull” Main Release Handle
13	147	1566	1434	“Look, Reach, Pull” Reserve Handle
14	147	1713	1287	
15	147	1860	1140	
16	147	2007	993	-Fully opened reserve
17	147	2154	846	
18	147	2301	699	
19	147	2448	552	
20	147	2595	405	400' AGL is the lowest altitude that one could expect to deploy their MT1S reserve and land under a full canopy
21	147	2742	258	
22	147	2889	111	
23	147	3036	-36	
24	147	3183	-183	
25	147	3330	-330	

*These figures are based on an average jumper’s exit weight of 250 lbs using an average age F111 drogue. Figures correspond to a terminal fall speed of 100 mph, approximate speed of a “streamer” malfunction.

Spinning Time/Distance Chart				
<u>Seconds</u>	<u>Ft/Sec</u>	<u>Distance Fallen</u>	<u>AG L</u>	<u>Action</u>
1	16	16	2984	“Jump Thousand”
2	48	64	2936	“Look Thousand”
3	80	144	2856	“Reach Thousand”
4	112	256	2744	“Wait Thousand”
5	138	394	2606	“Pull Thousand”
6	100	494	2506	“Check your canopy”
7	50	544	2456	-Spinning malfunction identified
8	20	564	2436	-Hands on toggles
9	45	609	2391	-1 st pump
10	45	654	2346	-2 nd pump
11	45	699	2301	-3 rd pump
12	45	744	2256	“Look, Reach, Pull” Main Release Handle
13	45	789	2211	“Look, Reach, Pull” Reserve Handle
14	45	834	2166	
15	45	879	2121	
16	45	924	2076	-Fully opened reserve
17	45	969	2031	
18	45	1014	1986	
19	45	1059	1941	
20	45	1104	1896	
21	45	1149	1851	
22	45	1194	1806	
23	45	1239	1761	
24	45	1284	1716	
25	45	1329	1671	
26	45	1374	1626	
27	45	1419	1581	
28	45	1464	1536	
29	45	1509	1491	
30	45	1554	1446	
31	45	1599	1401	
32	45	1644	1356	
33	45	1689	1311	

Spinning Time/Distance Chart				
34	45	1734	1266	
35	45	1779	1221	
36	45	1824	1176	
37	45	1869	1131	
38	45	1914	1086	
39	45	1959	1041	
40	45	2004	996	
41	45	2049	951	
42	45	2094	906	
43	45	2139	861	
44	45	2184	816	
45	45	2229	771	
46	45	2274	726	
47	45	2319	681	
48	45	2364	636	
49	45	2409	591	
50	45	2454	546	
51	45	2499	501	
52	45	2544	456	
53	45	2589	411	400' AGL is the lowest altitude that one could expect to deploy their MT1S reserve and land under a full canopy
54	45	2634	366	
55	45	2679	321	
56	45	2724	276	
57	45	2769	231	
58	45	2814	186	
59	45	2859	141	
60	45	2904	96	
61	45	2949	51	
62	45	2994	6	
*These figures are based on an average jumper's exit weight of 250 lbs using an average age F111 drogue. Figures correspond to a terminal fall speed of 100 mph, approximate speed of a "streamer" malfunction.				