



SAFETY MANAGEMENT SYSTEM (SMS)

Summary Analysis Report 2022

Canadian Sport Parachuting Association
204 - 1468 Laurier St
Rockland, ON K4K 1C7
www.cspa.ca

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ACKNOWLEDGEMENTS

The CSPA Technical and Safety Committee has prepared this report under the authority granted to it by the CSPA Board of Directors.

1 - INTRODUCTION

The Canadian Sport Parachuting Association (CSPA) integrated the Safety Management System (SMS) into the existing Accident/Incident/Malfunction (AIM) system back in 2014. Since then, the yearly SMS report has provided general statistics gathered from submitted AIM reports with a breakdown into four (4) categories within the skydiving industry:

- Tandem Skydives,
- Student Skydives,
- Experienced Skydives, and
- Aircraft.

The CSPA Technical & Safety Committee (T&SC) concluded in 2019 that there were areas of opportunity for a more in-depth SMS Summary Analysis Report provided to the skydiving community each year. The primary goals of the SMS Summary Analysis Report are:

- To assess areas of opportunity gathered from AIM reports that pose potential risk in skydiving;
- Minimize recurrence through education and awareness;
- and utilize trending analysis to modify and/or implement skill development material as needed.

With these goals in mind, the T&SC is hopeful that the skydiving community has another tool in the toolbox to support their long-term development in our sport.

2 – ACCIDENT/INCIDENT/MALFUNCTION (AIM) REPORTING

2.1. Purpose

An AIM report is a formal recording of the facts related to an accident, incident, and/or a malfunction. The report usually relates to an accident (any occurrence resulting in injury requiring medical attention or a fatality), or incident (any occurrence which could have resulted in a situation leading to injury or fatality) that has occurred. It also pertains to any unusual occurrences where a partial or complete malfunction of the equipment may have led to the initiation of emergency procedures. The sole purpose of the AIM report is to enhance safety and assess preventative measures.

2.2. Gathering of Information

Any incident that involves skydiver, staff, and/or customer safety should be recorded, no matter how insignificant it may seem. An investigation of what happened should be undertaken as soon as possible after the incident occurs and after any injured person(s) have been taken care of. The report that is generated as a result should provide a full account of what took place.

Following an occurrence, it is strongly recommended to submit an [AIM report](#) to CSPA's National Office. The CSPA Registered Participant involved, CSPA Coach, Instructors, Riggers, or other qualified personnel should submit the report directly to CSPA National Office, and we strongly recommend a copy be given to the involved dropzone for their records. In the event of an accident, injury, fatality and/or 3rd party loss, CSPA requires immediate notification and AIM reports must be filed within ten (10) working days of the occurrence.

2.3. How the AIM is used for analysis

All AIM reports received by the CSPA National Office, are reviewed for completion. Any AIM reports not completed properly will be returned with a request for proper completion. Gathered from the AIM reports are key areas of interest to assist in the SMS analysis, including but not limited to, type of occurrence, total jump numbers, and description of the occurrence. Details pertaining to participant(s) and location are kept confidential and not used for the SMS analysis.

Once AIM report data is entered into the SMS report data, the occurrence is categorized into four (4) categories within the skydiving industry:

- (1) Tandem Skydives,
- (2) Student Skydives,
- (3) Experienced Skydives, and
- (4) Aircraft

For each occurrence, the detailed description of the event and the recommendations of the Dropzone Safety Officer (DZSO) are carefully reviewed. A further breakdown of occurrence type and/or trend is applied. This includes such categories as Exit, Deployment, Freefall, Canopy, or Landing and is a general categorization of the main event described. Participant's total jump numbers and months since last jump were added to the SMS report data in 2020. This was in direct response to concerns surrounding the shorted skydive season because of the COVID-19 global pandemic. The T&SC wanted to further assess the impacts of currency and potential skydiving occurrences and trends. CSPA SMS data is also compared to CSPA historical results, and the International Skydiving Committee (ISC) Safety Survey Report to help identify any common trending and/or unique occurrences.

Upon entry and categorization of information of all AIM reports, the designated T&SC members begin to compile the qualitative data to identify trending and areas of opportunity for the skydiving community. As occurrences are identified, proposed action plans are provided. The goal of the proposed action plan(s) is to provide the skydiving community references for prevention, education, and coaching. Reference material often refers to areas within the CSPA Parachute Information Manuals (PIMs), manufacturers guidelines, and other CSPA source documents. Furthermore, each occurrence identifies who the proposed action plan is best suited for, such as but not limited to, the jumper, packer(s), coach(s), and/or instructor(s).

Upon completion of the SMS, the detailed AIM data report and statistics are posted to the CSPA website for reference, including the [historical comparisons](#) for the benefit of the skydiving community.

3 – 2022 AIM RESULTS

3.1. Overall AIM Submissions Statistics

We know that all occurrences are not reported through an AIM report for a variety of reasons. Most noted from past years, is the lack of AIM reports when an occurrence is not considered significant and/or did not result in an immediate injury. It is our hope that the AIM report is utilized more frequently even in occurrences that may seem less significant such as a low-speed malfunction resulting in emergency procedures being implemented and a successful landing in the designated landing area. Although it may appear it was a non-event because no one was injured, the occurrence itself can be useful in identifying trends and opportunities for further education.

Although we can conclude that not all occurrences may have been reported, we still believe it is important to analyze the data we are supplied with for potential areas of opportunity and preventative action plans to reduce the occurrence rates year after year. It is however observed that AIM reports are more likely to be completed for occurrences with Tandem Skydives, therefore providing us a more accurate reflection of the historical rate of occurrence in this area.

In 2022, a total of ninety-three (93) AIM reports were submitted. This is an increase of 22.37% over a submission of seventy-six (76) AIM reports in 2021 (*Table 1: Total AIMS Reported*). Looking at the overall breakdown, Experienced occurrences saw the largest increase in 2022 compared to 2021 (55.88% increase), while Tandem occurrences saw a decrease of 32%, and Student occurrences recorded a 35.29% increase (*Table 1: Total AIMS Reported*).

Analysis of trending indicated the following:

- (1) Combined Overall Occurrence Trending:
 - 11.16% increase over a 3-year trend
 - 14.53% increase over a 5-year trend
 - 22.98% increase over an 8-year trend
- (2) Tandem Occurrence Trending:
 - 26.09% decrease over a 3-year trend
 - 22.73% decrease over a 5-year trend
 - 14.47% decrease over an 8-year trend
- (3) Student Occurrence Trending:
 - 32.69% increase over a 3-year trend
 - 19.79% increase over a 5-year trend
 - 29.58% increase over an 8-year trend
- (4) Experience Occurrence Trending:
 - 22.31% increase over a 3-year trend
 - 33.17% increase over a 5-year trend
 - 42.76% increase over an 8-year trend

More in-depth review by occurrence categories will be discussed later in this report.

TABLE 1: Total AIMs Reported

	2022	2021	2020	2019	2018	2017	2016	2015	2014
Tandem	17	25	27	21	20	28	20	1	10
Student	23	17	12	8	36	18	21	7	9
Experience	53	34	43	33	36	46	37	15	30
Aircraft	0	0	0	0	1	2	4	0	1
Total	93	76	82	62	93	94	82	23	50

Reviewing the breakdown of total occurrence types, data indicated that most of the overall increase was seen in reported Incidents with an increase of 41.67% in 2022 compared to 2021. In reviewing the trending analysis specific to Incidents, we can also see an increase of 45.71% over a 3-year trend, 54.55% increase over a 5-year trend, and a 63.86% increase over an 8-year trend (*Table 2: Total AIMs Reported by Type*). This can be accounted for as we look closer at the occurrence types within each category. We can see a 51.43% increase in Landing occurrences in 2022 compared to 2021, with a 5-year trending increase of 22.12% (*Table 3: Total AIMs Reported by Category: Combined*). Of particular concern from 2022 data, is the increase of freefall occurrences, whereby an increase of 200% is seen in both the Student and Experienced categories.

TABLE 2: Total AIMs Reported by Type

	2022	2021	2020	2019	2018	2017	2016	2015	2014
Accident	43	38	45	36	57	54	36	2	19
Incident	17	12	6	5	15	10	16	2	10
Malfunction	28	24	29	19	20	26	25	18	17
Fatality	5	3	2	2	0	2	1	1	3
Total	93	76	82	62	92	92	78	23	49

*Aircraft occurrences are not reflected in this chart

*Tandem Double Fatality is only counted as one (1) AIM Type

TABLE 3: Total AIM Reported By Category: Combined

	Combined 2022	Combined 2021	Combined 2020	Combined 2019	Combined 2018	Combined 2017	Combined 2016	Combined 2015	Combined 2014
Exit	4	4	4	2	9	3	3	0	4
FreeFall	6	3	1	0	0	0	0	0	0
Deployment	30	34	33	22	26	25	14	3	4
Canopy	1	0	2	0	1	2	6	9	4
Landing	53	35	37	36	56	42	38	21	13
Other	0	0	5	0	0	0	0	0	3

Total AIM Reported By Category: Tandem

	Tandem 2022	Tandem 2021	Tandem 2020	Tandem 2019	Tandem 2018	Tandem 2017	Tandem 2016	Tandem 2015	Tandem 2014
Exit	1	2	2	2	1	1	1	0	0
FreeFall	1	2	0	0	0	0	0	0	0
Deployment	5	10	8	5	8	9	8	1	2
Canopy	0	0	0	0	1	2	2	1	2
Landing	10	11	15	14	10	16	10	3	5
Other	0	0	2	0	0	0	0	0	1

Total AIM Reported By Category: Student

	Student 2022	Student 2021	Student 2020	Student 2019	Student 2018	Student 2017	Student 2016	Student 2015	Student 2014
Exit	2	2	2	0	4	1	1	0	2
FreeFall	3	1	0	0	0	0	0	0	0
Deployment	5	6	1	3	9	8	3	1	1
Canopy	0	0	1	0	0	0	2	4	1
Landing	13	8	7	5	23	13	14	9	4
Other	0	0	1	0	0	0	0	0	1

Total AIM Reported By Category: Experience

	Experience 2022	Experience 2021	Experience 2020	Experience 2019	Experience 2018	Experience 2017	Experience 2016	Experience 2015	Experience 2014
Exit	1	0	0	0	4	1	1	0	2
FreeFall	2	0	1	0	0	0	0	0	0
Deployment	19	18	24	14	9	8	3	1	1
Canopy	1	0	1	0	0	0	2	4	1
Landing	30	16	15	17	23	13	14	9	4
Other	0	0	2	0	0	0	0	0	1

3.2. Tandem Skydive AIM Statistics

Based on the total submitted Tandem AIM reports for 2022, accidents accounted for 70.59%, with a decrease of 14.29% over 2021 of the Tandem categories, while trending over 5 years shows a decrease of 17.81% (*Table 4: Total AIMs Reported for Tandem Occurrences*). Malfunctions account for 23.53% of all Tandem AIM reports. We have seen an overall decrease in Tandem AIM reports by 34.62% compared to 2021, with a 3 year decreased trending of 27.14%.

Table 4: Total AIMs Reported for Tandem Occurrences

	2022	2021	2020	2019	2018	2017	2016	2015	2014
Accident	12	14	20	14	13	22	12	0	5
Incident	1	3	1	2	1	2	3	0	1
Malfunction	4	7	6	4	6	4	5	1	4
Fatality	0	2	0	1	0	0	0	0	0
Total	17	25	27	21	20	28	20	1	10

*Tandem Double Fatality is only counted as one (1) AIM Type

Landing occurrences account for 58.82% of all 2022 AIM report submissions for the Tandem category (*Table 3: Total AIMs Reported by Category: Tandem*). This indicates a 5-year trending decrease of 16.67%, however this can be accounted for in part by the decreased number of AIM submissions for 2022. Looking at all factors that were described in the AIM reports for each occurrence relating to landing, the following information was gathered:

- 50% was related to customers not lifting their legs upon landing,
- 33.33% was related to wind conditions such a turbulence and wind gusts at landing,
- 16.67% was related to an unexplained hard landing

Malfunctions accounted for 23.53% of all 2022 AIM report submissions in the Tandem category (*Table 4: Total AIMs Reported for Tandem Occurrences*), indicating an decrease of 42.86% over 2021. A breakdown of the occurrence resulting in a partial and/or complete malfunction, the following was identified:

- 50% preformed Emergency Procedures (EPs) successfully due to Line Twists
- 25% preformed EPs successfully due to Tension Knots
- 25% preformed EPs successfully due to drogue and bridal entanglement with control lines

3.3. Student Skydive AIM Statistics

Based on the total submitted AIM reports for 2022, accidents accounted for 47.83%, with an increase of 10% over 2021 in the student category and an increase of 10% over the 3-year trending. However, we can see a decrease in accident occurrences for Students of 11.29% over 5 years and 4.35% over 8 years of trending data (*Table 5: Total AIMs Reported for Student Occurrences*). In review of the data, it was indicated that 5.26 was the average jump number for Students who presented an occurrence. We continue to see an overall trending increase in reported Incidents with a 3 year trending increase of 66.67%.

Table 5: Total AIMs Report for Student Occurrences

	2022	2021	2020	2019	2018	2017	2016	2015	2014
Accident	11	10	9	5	27	13	16	1	5
Incident	5	3	1	1	7	1	2	1	1
Malfunction	6	4	2	2	2	3	3	5	3
Fatality	1	0	0	0	0	1	0	0	0
Total	23	17	12	8	36	18	21	7	9

Data indicated an increase of 62.50% in landing occurrences within the student category in 2022 compared to 2021, with a 5-year trending increase of 16.07% (*Table 3: Total AIMs Reported by Category: Student*). Looking at all factors that were described in the AIM reports for each occurrence relating to landing, the following information was gathered:

- 69.23% was related to flaring technique,
- 15.38% was related to lack of response to the Ground Control Instructor (GCI),
- 15.38% was related to a low turn during final approach on landing,
- 15.38% indicated no attempt at Parachute Landing Fall (PLF), whereby it was indicated that 7.7% did not sustain any injuries as a result of performing a PLF. It is with assumption, a lack of performing a PLF could be as high as 76.92% of the submitted AIM reports.

*Some occurrences had multiple contributing factors and therefore were included in multiple allocations

Deployment category accounted for 21.74% (*Table 3: Total AIMs Reported by Category: Student*). Looking at the trend analysis, there is a 25% increase over 3 years and 4.17% over 5 years. It can be noted that 40% of deployment/malfunctions were a result of a line over under canopy in which students did initiate emergency procedures without incident.

Although freefall occurrences only accounted for 13.04% of all submitted AIM reports for Students, it is important to note that all occurrences were identified as uncontrolled spinning in freefall. In one (1) instance the AAD activated. In another, a Progressive Freefall Instructor (PFFI) deployed the main parachute for the student.

3.4. Experienced Skydive AIM Statistics

Based on the total submitted AIM reports for 2022, Accidents accounted for 37.74%, with an increase of 42.86% over 2021 for the Experience category and a 5-year trending increase of 19.05%. Malfunctions accounted for 33.96%, with an increase of 38.46% over 2021 and a 5-year trending increase of 16.88% (*Table 6: Total AIMs Reported for Experience Occurrences*).

Although Incidents only accounted for 20.75% of the 2022 AIM reports for the Experienced category, we are seeing an increasing trending pattern with 57.14% increase over 3 years and 83.33% increase over 5 years. In review of the data, it was indicated that 821.13 was the average jump number for the Experienced category who presented an occurrence. Looking at only the reported accidents, the average jump number was 342.21 while further breakdown of reported Landing occurrences indicated an average jump number of 442.

Table 6: Total AIMs Report for Experience Occurrences

	2022	2021	2020	2019	2018	2017	2016	2015	2014
Accident	20	14	16	17	17	19	8	1	9
Incident	11	6	4	2	7	7	11	1	8
Malfunction	18	13	21	13	12	19	17	12	10
Fatality	4	1	2	1	0	1	1	1	3
Total	53	34	43	33	36	46	37	15	30

A closer analysis of the Experience category AIM reports indicated that deployment occurrences accounted for 35.85% of the total submissions (*Table 3: Total AIMs Reported by Category: Experience*) Looking at the 3-year trending, we can see a decrease of 6.56%, however an increase of 5.56% compared to 2021. In the deployment occurrences, 78.95% initiated Emergency Procedures, while 10.52% were AAD fires. Looking at all factors that were described in the AIM reports for each occurrence relating to deployment, the following information was gathered:

- 17.65% was related to line twists,
- 14.71% was related to issues during pull time - 40% of these issues were equipment related, and 25% resulted in an AAD activating,
- 11.76% was related to unstable body positions during deployment – 25% of these issues resulted in an AAD activating,
- 5.88% was related to tension knots,
- 5.88% was related to line overs.

In reviewing all the AIM reports submitted for the Experienced category, it was noted that Landing occurrences accounted for 56.6% of reported overall occurrences in 2022 (*Table 3: Total AIMs Reported by Category: Experience*). Landing occurrences accounted for 94.74% of all reported accidents and 63.64% of all reported incidents in the Experience category. Looking at all factors that were described in the AIM reports for each occurrence relating to landing, the following information was gathered:

- 34.48% was related to landing area hazards,
 - 60% of hazards was indicated as Terrain hazards,
 - 30% of hazards was indicated as Target fixation.
- 27.59% was related to irregular wind conditions at landing:
 - Turbulent wind conditions accounted for 25%
 - Downwind landing accounted for 50%
 - Crosswind landings accounted for 25%

- 17.24% was related to flare technique
 - Low flare accounted for 44.4%
 - Incomplete flare accounted for 44.4%
 - No flare accounted for 22.2%
 - High flare accounted for 11.1%
- 13.79% was related to landing patterns
- 6.97% was related to intentional and/or unintentional low turns
 - *Some occurrences had multiple contributing factors and therefor were included in multiple allocations

Additional observations important to note:

- A canopy collision on final was reported resulting in landing injuries sustained by two (2) jumpers. One jumper made an adjustment below 50 feet on final approach and did not see the second jumper ahead of them in time resulting in a canopy collision around 30 feet above landing area.
- During a freefall occurrence, a group of angle flyers narrowly missed a solo jumper because the group was flying up jump run. No injuries were reported.

3.5. Aircraft AIM Statistics

There were no recorded occurrences for Aircraft in 2022. It should be noted that there were three (3) occurrences in which a jumper landed on the runway and in two (2) of these, the pilot of an aircraft performed the appropriate avoidance techniques.

3.6. Fatality AIM Statistics

A total of five (5) fatalities occurred in 2022. One (1) fatality was within the Student Category (prior Student Category fatality was in 2017), while there were four (4) Experienced Category fatalities (this is the highest recorded Experienced Category fatalities since recording AIM data in 2014). All fatalities are still under investigation and therefore no analysis will be provided at this time.

4 – CONCLUSIONS

4.1. General Recommendations

Although it is important for case by case occurrences to be reviewed, there are some key common occurrences across both Students, Experience Skydivers, and Coaches that can be addressed. Reviewing existing educational tools can benefit the skydiving community.

- **Intentional and unintentional low turns can result in serious injury or death.** It is important to recognize your limitations, including but not limited to, currency, skill level, external inputs, and personal inputs. Review of CSPA PIM2B; Section 6.3.1 *Factors Affecting Human Performance*, will assist in recognizing performance inhibiting factors.
- Altitude Awareness is our #1 survival skill. "The minimum altitudes (AGL) at which the main parachute must be activated are:
 - 4500' for all Tandem jumps
 - 3000' for all students, Solo & A CoP holders
 - 2500' for B, C, and D CoP holders" (CSPA PIM1; Section 2.5 *Basic Safety Rules - General*)
- Reviewing malfunctions often will help jumpers deal with most situations that can occur at opening (PIM2B; Section 6.1.1 *Canopy Malfunctions Review*)
- Review and practice of Emergency Procedures should be conducted regularly (CSPA PIM2A-2009; Section 3.3 *Activation of Reserve (Emergency Procedures)*).
- Review educational material on *Landing Techniques* (CSPA PIM2A-2009; Section 6.7), *Landing Pattern* (CSPA PIM2A-2009; Section 6.9), and *Landing Problems and Solutions* (CSPA PIM2A-2009; Section 6.17.5);
- Review educational material on *Hazards Near the Ground* (CSPA PIM2A-2009; Section 6.17.4)
- Review and practice the Parachute Landing Fall (PLF) (*SSI Reference Manual, Appendix - Skydiving Technical Knowledge PLF Landing*).
- Review the [CSPA Sport Canopy Endorsements](#) document and practice appropriate canopy skill(s) related to areas of performance opportunity
- Review proper body position during deployment, (CSPA PIM2A-2009; Section 5.4 *Activation*)

Additionally, it is important to consider the following:

- Refer to the CSPA Skydiving Skills Grid on a regular basis to understand and educate yourself on progressing in the sport safely
- Review of equipment specific packing procedures should be completed and consult with a Rigger if necessary
- Assess, flag, and/or repair potential obstacles and hazard areas in landing area, such as uneven ground, animal holes, drainage, and so forth to minimize potential injury
- Anticipatory skills can be improved if you learn and practice skydiving skills in the sequence in which they occur, and mentally and physically rehearse the skydive and your emergency procedures, therefore a focused review on *Section 2 Preparation: Mental and Physical* (CSPA PIM2A-2009)
- Attend a Safety Day, either through your own Dropzone or wherever you can find one, every year so you stay updated and reminded of good skydive practices

4.2. Experienced Jumpers and Coaches Additional Recommendations

Of key importance for skydiving instructors and coaches, the following should be considered:

- Jumper should perform and review procedures of full gear checks prior to boarding the aircraft (CSPA PIM2A-2009; Section 3.7.1 *Safety Check*).
- Regular inspection of equipment during packing should be completed and any identified issues addressed. Consultation with a Rigger is recommended for any equipment uncertainties.
- Never attempt anything beyond your skill level, or without first consulting a certified coach experienced in that discipline. Consultation with a CSPA Coach 3 is encouraged specific to Wingsuiting, Canopy Piloting, and Freeflying
- Review of PIM2B (2016) Section 6.5 *Assessing Terrain* is recommended to understand the effects and dangers of turbulence.
- Actively look at the sight picture at various altitudes during the climb to altitude, to develop visual cues.
- Jumpers should ensure a clear understanding and review of Safety for Small Group FS practices (CSPA PIM2B-2016; Section 5.6.2).
- Review educational material on *Improving Your Accuracy* (CSPA Sport Canopy Endorsement; Landing Patterns)
- Canopy control starts even prior to any skydiver getting into a plane and a lot of factors need to be considered/coached: Review of *Pre-Boarding Considerations (Canopy Information)*; CSPA Sport Canopy Endorsement

4.3. Instructor (PFFI, SSI, JM, GCI) Additional Recommendations

In further analysis of the student occurrences the T&SC, in collaboration with the CSPA Coaching Working Committee (CWC), additional key factors for Instructors were identified resulting in the following to also be considered:

- Instructors and students should review the PFF Instructor Progressive Freefall Reference Manual; "The 6 Phases of the PFF Program Skills Grid Inflight", Section 5 The Exit.
 - The "Motion/Departure" is particularly important since it is with this stage that you will synchronize the departure of the student and instructor(s). Take time to practice this crucial stage on the ground since it will determine the departure and the freefall that will follow. A mis-timed departure often generates a chaotic jump. In general, three good practices on the ground increases the chances of success.
- Instructor should review Module 5: Control Techniques and Unusual Situations (PFFI Reference Manual), specifically Freefall Control.
- Jump Masters (JM) should review material on Assisting the Students Exit (JM Reference Manual, Section 2.9.2), Deployment System Control (JM Reference Manual, Section 2.9.3), and Climb Out Situations (JM Reference Manual, Section 4.1.3).
- Careful evaluation of student's practice on the ground against a pre-defined standard is an essential aspect of student training. If the student is unable to perform the tasks on the ground, correctly and in real time, they are unlikely to perform correctly in the freefall. Freefall tasks are high stress, and there must be enough repetitions and proper evaluations of the student's demonstration of the skills on the ground (min 3x correctly in real time). Instructors should clearly understand what they are teaching, why, and what the acceptable standard is for a student to be allowed to perform the skydive.

- "Every student shall receive a safety check by an Instructor or Coach prior to boarding the aircraft" (CSPA PIM1; *Basic Safety Rules - Students & Instructors*, Section 2.13)
- Student waivers should be reviewed, and students should be asked if any pre-existing medical conditions and/or concerns that could inhibit the ability for a safe skydive. Instructors should have the student practice with realism on the ground as this may identify any barriers to a safe skydive.
- Actively ask the student to look at the sight picture at various altitudes during the climb to altitude, to develop visual cues.
- Instructor and Student to review and practice flare technique on the ground prior to skydive, including but not limited to, the guidance from Ground Control Instructor (GCI) to students in the landing of their canopies, through use of a recognized method of signaling.
- GCI should ensure accurate coaching and currency reviewing the Ground Control Instructor Reference Manual, *Communication Rules*.
- Instructors should ensure detailed information pertaining to individual skydive performance is recorded accurately in student's logbook (CSPA PIM2A-2009; Section 2.5 *Logging*).

4.4. Dropzone Safety Officer (DZSO) and Dropzone Owners (DZO) Additional Recommendations

In further analysis of the Overall AIM occurrences the T&SC, in collaboration with the CSPA Coaching Working Committee (CWC), additional key factors for DZSOs & DZOs were identified resulting in the following to also be considered:

- DZSOs and/or DZOs should evaluate how altitude awareness is being trained and look for any possible improvements to their existing training processes.
- Ensure skydivers have the required training before attempting any skill, or using any equipment (e.g., downsizing a canopy). Jumpers, Coaches, Instructors, and Drop Zone Safety Officers are encouraged to refer to PIM2B, Section 3.13 *Parachute Downsizing Criterion* to ensure the appropriate downsizing for an individual.
- Student waivers should be reviewed, and students should be asked if any pre-existing medical conditions and/or concerns that could inhibit the ability for a safe skydive.
- An audit of the DZ Student Program should be conducted regularly to ensure any areas of opportunity and/or process changes are addressed and updated accordingly.
- Regularly assess, flag, and/or repair potential obstacles and hazard areas in landing area, such as uneven ground, animal holes, drainage, and so forth to minimize potential injury. Understand how change in climate, such as extremely dry or wet areas, can create unusual hazards in the landing zone and surrounding areas.
- Educate packers on regular gear checks, including but not limited to, checking the condition of lines when packing parachutes. Ensure Standard Operating Procedure (SOP) in place for packers and/or riggers to report any equipment concerns.
- DZSOs are encouraged to actively promote, educate, and enforce safety at a dropzone in collaboration with the DZO for all jumpers, instructors, coaches, and staff.
- DZSO and/or DZO recommendations on the AIM reports are a crucial component in the overall understanding and analysis of occurrences. We strongly encourage all DZSOs and DZOs to record all occurrences (accident, incidents, and malfunctions) to ensure our skydiving community has an opportunity to learn and further enhance our safety tools. CSPA can assist in confidential root cause analysis surrounding any areas of concern and/or proactive preventative measures, upon request.

4.5. Riggers and Packers Additional Recommendations

Of key importance for Riggers and Packers, the following should also be considered:

- Regular inspection of equipment during packing should be completed and any identified issues addressed
- Tension knots were a cause of three (3) EPs being followed (one was on a Student Skydive), it is recommended that Riggers and Packers further review material(s) on preventing packing a tension knot. Suggested reference [here](#).
- Packers should consult with a Rigger for any equipment uncertainties and/or packing procedure concerns/questions.
- Review of equipment specific packing procedures should be completed and consult with a Rigger if necessary
- Regular review of the [Equipment Technical Bulletins](#).

Effective January 1, 2024, riggers will be required to complete and submit the Rigger Rating Maintenance and Revalidation Form with their annual CSPA Affiliation Renewal. Changes have been made to the annual requirements specific to rigger rating levels. We ask that you review the changes and ensure that over the 2023 year, you successfully meet or exceed the requirements to maintain your rigger rating in 2024. Requirements to keep accurate logs in the event a request is made by the CSPA or any Canadian Government agency to view them continues to be required.

The CSPA rigging program teaches the concept of good rigging ethics, which includes, but is not limited to, being able to communicate rigger-to-rigger when irregularities are found on inspections. The [Rigger SMS](#) is intended to be used if irregularities are discovered and unresolved using good rigging ethics. In addition, it is a process to educate riggers on issues and procedures. All personal information will remain anonymous, and only redacted reports will be sent for review. The reporting process is not considered a formal complaint and will only be used for educational purposes.

5 – SUMMARY

According to the 2021 International Skydiving Commission (ISC) Safety Survey Report, it was concluded that human error on the part of the skydiver accounted for 72% of all reported fatalities in 2021 (based on data supplied by 45 countries). 6.65 million skydives were made by 1.2 million jumpers worldwide with thirty-two (32) reported fatalities in 2021. The ISC Technical & Safety Committee also reported that this percentage was consistently high over many years. The report states, “Human error has always been, and continues to be, the major factor in skydiving fatalities. The attention of all personnel involved in coaching and training must be continuously focused on safety training and reinforcement. Safety is best taught at Dropzones, where students, from their first jump, and as they progress, have their attention drawn to safety issues and safe conduct.” (2021 ISC Safety Survey Report; Section 4.2)

Fatalities were broken down into the following categories:

- Students (0-25 Freefalls) 3 Total (1 Solo Student & 2 Tandem Students)
- Intermediate (26-250 Freefalls) 5 Total
- Experts (251+ Freefalls) 24 Total (Data includes 3 Tandem Instructors)

Canopy Handling accounted for 41% of fatalities in 2021 (22% International fast landings, 16% Tandems, and 13% Other landing issues). Additionally, it should be noted that two (2) of the fatalities were a result of incorrect emergency procedures, as well as, two (2) indicated a cutaway & low/no reserve pull, and one (1) no pull/low on main parachute.

2021 marks thirty-five (35) years since the ISC began collecting skydiving data. The data has helped to identify areas of opportunity to improve safety world-wide. In recent years, information has been gathered from countries regarding the use of Automatic Activation Devices (AADs). Based on the information gathered for 2021 by the ISC, all countries that responded to the ISC survey (40 countries), indicated the following:

- 100% of Students use AADs
- 78% of Intermediate jumpers use AADs
- 50% of Expert jumpers use AADs
- Of the data received it is noted that eighteen (18) countries reported 100% use of AADs across all jumpers.

Furthermore, when countries were asked, “*How many times in 2021 did the use of AAD save jumpers’ lives?*”, it was reported that fifty-five (55) AAD fires directly resulted in saving a jumpers life. The ISC further states, “*While there are many varying factors in an AAD firing, the large number reported as saving lives is a cause for concern. The actual number of ‘saves’ may in fact be somewhat greater than the reported 55, as AADs can be field-serviced. The widespread use of AAD would appear to be a major factor in the reduction of skydiving fatalities.*” (2021 ISC Safety Survey Report; Section 3.3)

The reason we look to our own AIM report analysis and those at the international level, is to identify common trends and work toward preventative measures to allow for continued safety in our skydiving community. Completing AIM reports, no matter how insignificant one may feel the occurrence is, helps assist in the common goal of fatality prevention worldwide.

It is important to recognize your limitations, including but not limited to, currency, skill level, external inputs, and personal inputs. Review of CSPA PIM2B; Section 6.3.1 *Factors Affecting Human Performance* will assist in recognizing possible performance inhibiting factors. Additionally, jumpers should regularly review the [CSPA Sport Canopy Endorsement](#) document to ensure a safe transition during training and to assist in their overall

skills development and awareness. Exercising caution, common sense, self-discipline, control, alertness, and better judgment is highly recommended to help ensure continued safety. Never attempt anything beyond your skill level, or without first consulting a certified coach experienced in that discipline.

6 – REFERENCES AND RESOURCES

- [CSPA PIM 1: Basic Safety Rules and Recommendations](#)
- [CSPA PIM 2A: Basic Skydiving Skills](#)
- [CSPA PIM 2B: Recreational Skydiving Skills](#)
- [CSPA PIM 2C: Advanced Skydiving Skills](#)
- [Long Term Development \(LTD\) Flight Plan](#)
- [Sport Canopy Endorsements](#)
- [Safety Day](#)
- [Technical Recommendations](#)
- [Equipment Technical Bulletins](#)
- [Safety Management System](#)
- [AIM Report](#)
- [JM – Reference Manual](#)
- [PFFI – Reference Manual](#)
- [GCI – Reference Manual](#)
- [SSI – Reference Manual](#)