



SAFETY MANAGEMENT SYSTEM (SMS)

Summary Analysis Report 2021

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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 – 2021 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 analyse 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 2021, a total of seventy-six (76) AIM reports were submitted. This is a decrease of 7.32% over a submission of eighty-two (82) AIM reports in 2020 (*Table 1: Total AIMS Reported*). Looking at the overall breakdown, Student occurrences saw the largest increase in 2021 compared to 2020 (41.67% increase), while Experience occurrences saw a decrease of 20.93%, and Tandem occurrences recorded a 7.41% decrease (*Table 1: Total AIMS Reported*).

Analysis of trending indicated the following:

(1) Combined Overall Occurrence Trending:

- 3.51% increase over a 3-year trend
- 7.11% decrease over a 5-year trend
- 7.01% increase over an 8-year trend (since the start of SMS analysis)

(2) Tandem Occurrence Trending:

- No change in occurrence trending over a 3- and 5-year trend
- 2.67% increase over a 3-year trend
- 3.20% decrease over a 5-year trend
- 22.22% increase over an 8-year trend

(3) Student Occurrence Trending:

- 27.45% increase over a 3-year trend
- 7.06% decrease over a 5-year trend
- 8.33% increase over an 8-year trend

(4) Experience Occurrence Trending:

- 6.86% decrease over a 3-year trend
- 12.35% decrease over a 5-year trend
- 0.30% decrease over an 8-year trend
-

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

TABLE 1: Total AIMs Reported

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

Given that 2021 and 2020 had unique external factors to the regular skydiving operations across our country and globally, because of the COVID-19 pandemic, the data was assessed for the correlation between increased occurrences and skydiving currency. Although remaining current within our industry is of immense value to all skydiving safety, the trends seen as we analyzed further into the 2020 data did not specifically identify lack of currency as the main area of potential risk. However, the T&SC continued to monitor and assess the potential impacts of currency as it relates specifically to reported occurrences in the 2021 skydiving season. Of particular concern that arose from analysing the combined 2020 and 2021 data, was the potential correlation between Student occurrences and Instructor currency and Dropzone Student Programs.

Reviewing the breakdown of total occurrence types, data indicated that most of the overall increase was seen in reported Incidents with an increase of 100% in 2021 compared to 2020. In reviewing the trending analysis specific to Incidents, we can also see an increase of 36.11% over a 3-year trend, 20.00% increase over a 5-year trend, and a 41.67% 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 12.50% increase in Landing occurrences within the student category in 2021 compared to 2020, with a 5-year trending increase of 224% (*Table 3: Total AIMs Reported by Category: Student*).

When looking at other occurrence types, particularly at the 5-year trending, it is encouraging to see a 20.53% decrease in Accidents and only a slight increase of 1.67% for Malfunctions. Although overall fatalities are low, we are continuing to see a decrease trending of 66.67% over 3 years, 40.00% over 5 years, and a 25.00% decrease over 8 years (*Table 2: Total AIMs Reported by Type*).

TABLE 2: Total AIMs Reported by Type

	2021	2020	2019	2018	2017	2016	2015	2014
Accident	38	45	36	57	54	36	2	19
Incident	12	6	5	15	10	16	2	10
Malfunction	24	29	19	20	26	25	18	17
Fatality	3	2	2	0	2	1	1	3
Total	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 2021	Combined 2020	Combined 2019	Combined 2018	Combined 2017	Combined 2016	Combined 2015	Combined 2014
Exit	4	4	2	9	3	3	0	4
FreeFall	3	1	0	0	0	0	0	0
Deployment	34	33	22	26	25	14	3	4
Canopy	0	2	0	1	2	6	9	4
Landing	35	37	36	56	42	38	21	13
Other	0	5	0	0	0	0	0	3

Total AIM Reported By Category: Tandem

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

Total AIM Reported By Category: Student

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

Total AIM Reported By Category: Experience

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

3.2. Tandem Skydive AIM Statistics

Based on the total submitted AIM reports for 2021, accidents accounted for 53.85%, with a decrease of 30.00% over 2020 of the Tandem categories, while trending over 5 years shows a decrease of 18.57% (*Table 4: Total AIMS Reported for Tandem Occurrences*). However, we continue to see an overall increase in Incident trending with 33.33% over 3 years and 40.00% over 5 years. Similarly, we are also finding a trending increase in Malfunctions with 19.05% over 3 years and 22.86% over 5 years.

Table 4: Total AIMS Reported for Tandem Occurrences

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

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

Landing occurrences account for 44% of all 2021 AIM report submissions for the Tandem category (*Table 3: Total AIMS Reported by Category: Tandem*). This indicates a 5-year trending increase of 94.29%, however a decrease of 36.36% over 2020. Looking at all factors that were described in the AIM reports for each occurrence relating to landing, the following information was gathered:

- 63.64% was related to customers not lifting their legs upon landing
- 18.18% was related to an ineffective flare
- 9.10% was related to wind conditions such a turbulence and wind gusts at landing
- 9.10% was related to landing area hazards

Malfunctions accounted for 26.92% of all 2021 AIM report submissions in the Tandem category (Table 4: Total AIMs Reported for Tandem Occurrences), indicating an increase of 16.67% over 2020. A breakdown of the occurrence resulting in a partial and/or complete malfunction, the following was identified:

- 57.14% preformed Emergency Procedures (EPs) successfully due to Line Twists
- 28.57% preformed EPs successfully due to Tension Knots

It was also noted that two (2) Deployment occurrences were recorded due to issues with the canopy (one with a canopy tear and the other with kill lines out of specification). In these events, emergency procedures were not initiated, and one was recorded as a landing occurrence not a malfunction.

3.3. Student Skydive AIM Statistics

Based on the total submitted AIM reports for 2021, accidents accounted for 58.82%, with an increase of 11.11% over 2020 in the student category and an increase of 20% over the 3-year trending. However, we can see a decrease in accident occurrences for Students of 28% over 5 years and 8.33% over 8 years of trending data (Table 5: Total AIMs Reported for Student Occurrences). In review of the data, it was indicated that 5.8 was the average jump number for Students who presented an occurrence.

Table 5: Total AIMs Report for Student Occurrences

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

As previously mentioned, we can see a 12.50% increase in Landing occurrences within the student category in 2021 compared to 2020, with a 5-year trending increase of 224% (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:

- 62.50% was related to flaring technique
 - 50% was related to lack of response to the Ground Control Instructor (GCI)
 - 50% was related to a low turn during final approach on landing
 - 25% was due to wind conditions
- *Some occurrences had multiple contributing factors and therefore were included in multiple allocations

Although malfunctions only accounted for 23.53% of all Student occurrences, Deployment category accounted for 35.29% (Table 3: Total AIMs Reported by Category: Student). Looking at the 5-year trend analysis, there is a 333.33% increase over 3 years and 180% over 5 years. Of most notable concern is that there were four (4) situations in which the Automatic Activation Device (AAD) was fired, accounting for 66.67% of the Student Deployment occurrences. It was identified that in all four (4) incidents, the common factor was loss of altitude awareness. The distractions during freefall that lead to altitude awareness was a loss of heading control in three (3) of the incidents and a delay in releasing the pilot chute in one (1) incident.

3.4. Experienced Skydive AIM Statistics

Based on the total submitted AIM reports for 2021, Accident accounted for 41.18%, with a decrease of 6.67% over 2020 for the Experience category and a 5-year trending decrease of 17.14%. Malfunctions accounted for 38.24%, with a decrease of 38.10% over 2020 and a 5-year trending decrease of 20% (*Table 6: Total AIMs Reported for Experience Occurrences*).

Although Incidents only accounted for 17.65% of the 2021 AIM reports for the Experienced category, we are seeing an increasing trending pattern with 33.33% increase over 3 years and 13.33% increase over 5 years. In review of the data, it was indicated that 965.55 was the average jump number for the Experienced category who presented an occurrence.

Table 6: Total AIMs Report for Experience Occurrences

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

A closer analysis of the Experience category AIM reports indicated that deployment occurrences accounted for 52.94% of the total submissions (*Table 3: Total AIMs Reported by Category: Experience*) although this is down from 2020, we see an increase of 104.29% with the 5-year trending. In the deployment occurrences, 72.22% initiated Emergency Procedures. Looking at all factors that were described in the AIM reports for each occurrence relating to deployment, the following information was gathered:

- 50% was related to line twists
- 11.11% was related to a hard opening
- 5.56% was related to a step through
- 5.56% was related to a bag lock
- 5.56% was related to a premature deployment of the main parachute
- 5.56% was related to unstable opening causing line entanglement with container

Under further analysis, it was identified that two (2) deployment occurrences were related to the Automatic Activation Device (AAD) firing. One (1) occurrence of the AAD firing was during a riser turn. It was further discovered that the AAD mode was set incorrectly. The other occurrence was a result of loss of altitude awareness and delaying main parachute deployment creating a two out canopy situation when the ADD fired.

In reviewing all the AIM reports submitted for the Experienced category, it was noted that Landing occurrences accounted for 47.06% of reported overall occurrences in 2021 (*Table 3: Total AIMs Reported by Category: Experience*). Landing occurrences accounted for 85.71% of all reported accidents 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:

- 27.78% was related to landing area hazards
- 23.81% was related to irregular wind conditions at landing:
 - Turbulent wind conditions accounted for 33.33%
 - Downwind landing accounted for 16.67%
 - Crosswind landings accounted for 16.67%

- No wind landings accounted for 16.67%
 - High wind conditions accounted for 16.67%
 - 18.75% was related to intentional and/or unintentional low turns
 - 11.11% was related to flare technique
 - 5.56% was related to landing patterns
 - 5.56% was related to obstacles in the landing area
 - 5.56% was related to inexperience on downsized main parachute
- *Some occurrences had multiple contributing factors and therefor were included in multiple allocations

3.5. Aircraft AIM Statistics

There were no recorded occurrences for Aircraft in 2021.

3.6. Fatality AIM Statistics

A total of three (3) fatalities occurred in 2021. One (1) fatality was within the Experienced Category while there was a double fatality on a single Tandem. 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 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:

- 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.
- Review of PIM2B (2016) Section 6.5 *Assessing Terrain* is recommended to understand the effects and dangers of turbulence.
- Skydivers have a responsibility to ensure that they 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.
- Actively look at the sight picture at various altitudes during the climb to altitude, to develop visual cues.

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 exits will always comprise of three stages that you will have to teach:
 - Positioning,
 - Motion/departure
 - Body position on launch
- The Motion 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.
- AAD fires should not be taken lightly. 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.
- *"The following recommendations are generally accepted minimum standards for parachuting operations. While not considered to be absolute minimums like the BSRs, variations from these recommendations must be applied for in writing to the applicable technical committee(s), and written approval obtained... The following are the maximum surface wind speeds, in which sport parachute jumps may be carried out:*

- *Student Parachutists - 15 mph (7 m/sec.)" (PIM1: Basic Safety Rules & Recommendations; Section 3: Technical Recommendations).*
- 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.
- Consideration of equipment for students such as audible altimeters.
- Training facilities no longer able to use a tunnel should give additional attention to freefall control, body position, and recovery of uncontrollable turns.
- 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.
- 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. Rigger and Packer 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 (two were on Tandem Skydives), 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](#).

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 2020 International Skydiving Commission (ISC) Safety Survey Report, it was concluded that human error on the part of the skydiver accounted for 81% of all reported fatalities in 2020 (based on data supplied by 45 countries). 5.3 million skydives were made by 1.02 million jumpers worldwide with thirty-one (31) reported fatalities in 2020. The ISC Technical & Safety Committee also reported that this percentage was consistently high over many years. Therefore, pointing to the constant need to reinforce training and safety procedures at all levels in skydiving.

In a further breakdown, the ISC reported that the main contributing factors that led to fatalities was,

- (1) Canopy Handling,
- (2) Canopy Control, and
- (3) Landing Issues.

Furthermore, 77% had at least one good parachute and 55% occurred after the successful deployment of the main. When looking at landing issues, 24% were general landing errors, while 34% were intentional fast landings, and 10% were Tandem skydives. Of the fatalities, 13% were students (0-25 jumps; two of these fatalities were students on their first jump not Tandem), 26% were Intermediate (26-250 jumps), and 61% Expert (251+ jumps).

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](#)