

# INFORMATION BULLETIN HELICOPTER SAFETY

## ACC Safety Committee by Murray Toft

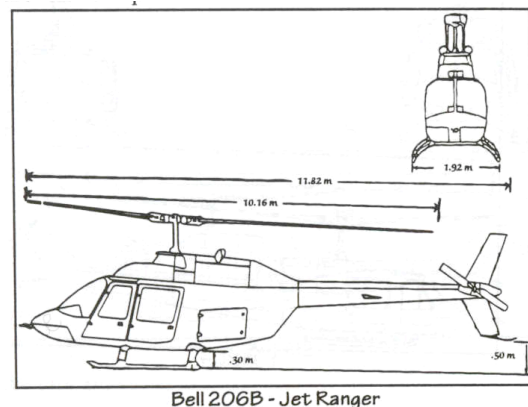
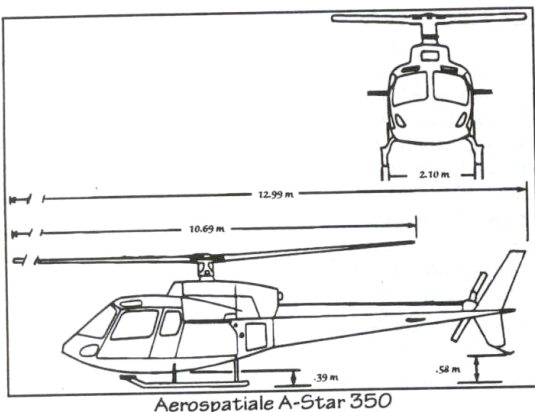
### TO HELI WITH YOU?

The use of helicopters in wilderness is an issue that can quickly add heat to campfire conversation over what is “*appropriate use*”. Regardless of your philosophical perspective, helicopters are increasingly used by members as vehicles to access ACC and other private camps, year ‘round. This means that at some time you are likely to become part of the growing use pattern. When that day arrives, you should have a basic level of awareness as to helicopter operational requirements and your corresponding expectations and behavior. This information package should help you to understand more about what you are getting into when employing this miracle aircraft.

### Choose your weapons:

In western Canada the most commonly used helicopters for mountain flying are the **A-Star** and the **Jet Ranger**. Larger companies will most likely have either machine at their disposal. Overall consideration of the various logistical concerns which deal with flight plan, fuel economy, number of passengers, baggage, weather, etc., will determine what type of machine will be best suited for the operation and your budget.

To differentiate one machine from the other, simply observe the main rotor. The A-Star has three blades while the Jet Ranger has two. Bubble shape is quite distinct as well with a more pointed nose on the Ranger (like a pouting lower lip); blunt and angular on the A-Star. A comparison of their features is quickly seen as follows:



### Getting loaded:

Weight is our enemy, whether we're carrying it on our backs or in a helicopter. And there is more involved with the weight to cost relationship than you might at first think. How the weight is packaged is a primary consideration for your pilot as he tries to make sense of that huge pile of duffel and people amassing at the staging area. Somehow he has to sort baggage and passengers into the most efficient weight and space combination so it all fits, while meeting your expectations of economy.

We can help our pilot by doing two things ahead of time. We can **weigh our individual packs and packages**, and weigh ourselves. All we need is a standard bathroom scale to do the job. Simply weigh yourself, then again when you're holding your pack or box or equipment item, then note the gross weight. Simply do the obvious subtraction to deduce the weight of your package. With a permanent felt pen you can make an easily seen "baggage tag" by writing the package weight on a piece of duct tape and sticking it on the top of the box or pack. It takes a bit more sensitivity and cunning to make a list of your group and their individual dressed weights! But if you can hand a card to your pilot with each group member's weight, it will help him to prepare the loads. This simple pre-flight weigh-in is especially useful and time saving when the staging area is remote and far from any industrial-sized scales.

It is very worthwhile to have a chat with your pilot before the adventure begins, about what you might consider **dangerous goods** to be. For example, where does that 25 lb. tank of propane go? Technically, a "Dangerous Goods Declaration" may need to be filled out before the pilot will carry some items. Twelve-volt car batteries need to be enclosed within special boxes to prevent / contain acid spills or possible arcing with other materials. Firearms have their own protocol. Ice axes may be relegated to the ski basket. **Bear spray** must always be left in the baggage compartment. To have one of these accidentally go off inside the cabin of the helicopter is to commit manslaughter! If your machine will have a ski basket, put all the pointed gear in it – crampons, ice axes, industrial tent poles, etc.

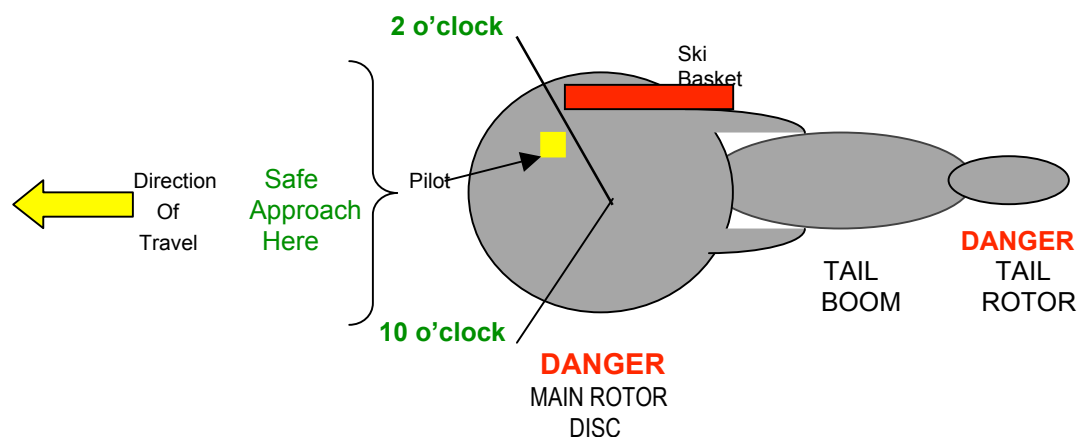
Since helicopters are weight-conscious machines, their skins are made of very light metal sheeting and subject to puncturing and tearing. Attention should be given to any metal equipment and fittings and how they may impact the aircraft. If you are in charge of loading the **baggage compartment**, review its size and shape, then look at your baggage and think about what orientation may best fit the space. In winter, it may be worth considering what it will be like to unload this if you are not standing on a solid landing pad, but rather up to your knees in powder snow! You may find that your reach will be just a little bit short. It is **important not to overstuff** this area for two reasons: 1) it may be difficult to secure the door, and even if you manage to do this, you may just be creating a "jack-in-the-box" effect for whomever does the unloading. Surprises like this around a helicopter are definite no-no's as are stressing the hinges or latches; 2) in the A-Star, the cables to the tail rotor control run just over the top sheet of the baggage compartment. Forcing that last item of baggage into the top of this area can lock-up the

control cables, which the pilot will feel with his foot pedals. This will likely require a shut down and a re-evaluation by the pilot of what it is that you're trying to engineer. Avoid this unnecessary waste of time and embarrassment by resisting the urge to pack too tightly.

Where shuttles are dovetailed with other in-coming or out-going groups, a useful strategy is to use two different colors of seismic flagging tape to **identify IN or OUT bound gear**. A short piece securely tied or well taped to a visible fixed point on each item of duffel can vastly improve the confusion about whose gear is going which way. In addition, you can create two clearly identified “**baggage corrals**” close to the landing pad to separate incoming from outgoing gear. There is nothing that improves your skiing faster than spending a week in a remote ski camp on someone else's skis!

Circumstances dealing with such factors as the landing area, visibility, and experience of the group, will determine whether the pilot shuts down or remains idling during a **dovetail shuttle**. If there is a significant exchange of baggage he may very well choose to shut down completely. However, if the pilot remains in the machine with the rotors idling, there are some important safety considerations to follow:

1) Be sure to approach the machine from a position where you can **maintain eye contact** with the pilot. This means that you can only approach the machine forward of the mid-section. Working in a zone roughly between a “ten o'clock” and “two o'clock” position from the front of the bubble means that the pilot can see you at all times. Outside of this frontal zone means that you are increasingly working toward a blind area and the ever-threatening, nearly invisible, tail rotor.



**Fig. 1** Helicopter Danger Zones: Top view

2) It may be safest to create a **baggage corral** close to where the left side of the machine will be when it touches down at the landing. A three meter space between the landing stake and the near edge of your baggage dump will be sufficient space to land a jet Ranger or A-Star. This will reduce the amount of portered baggage from outside the main rotor disc area. More experienced party member(s) can be used to manage this

duffel and **hold down any items that may slip away and blow** up into the rotors. This is especially important on snow.

3) **Never** should any items be carried **over the shoulder** or swung over the head anywhere near the helicopter. The integrity of the main rotor must ALWAYS be respected. In winter, skis should be strapped together and dragged low, by their tips, toward the helicopter.

### **Ready for take-off?:**

The noise from a helicopter, whether it is approaching or departing a landing, can be a stress-producing event. This **stress affects people in different ways**, and you may be surprised at the occasional irrational behavior that is produced, especially with first-time passengers. The common tendency is to want to rush, when what is needed is methodical deliberation. Since you only pay for the time the machine is in the air, there is no need to panic. A thorough **pre-flight briefing by the pilot** will help to familiarize passengers and reduce anxiety. Having clear expectations about group movement and responsibilities beforehand will minimize anxiety and confusion.

If you and your party are in the landing area as a machine comes in, it is best to remain as a small group in a crouching position, diagonally out to the front on the passenger side, well out of reach of the main rotor. Depending on the machine being used, a safe distance can be estimated from the pilot's landing reference point by using the main rotor radius. Along with the noise is an inevitable dust storm produced from **rotor wash** as the machine creates a cushion of air against the ground. The air is dramatically filled with blowing snow or dust and it is easy to lose one's orientation. Snug-fitting ski goggles in winter and safety goggles in summer are very worthwhile to keep grit from being eye-born. Headwear should be securely fastened. Baseball caps in summer are especially prone to being blown off. Resist the temptation to reach or chase a hat that blows. It could easily cost you a hand or more.

When you get a signal from the pilot, **approach the machine remaining in a crouched position**. This may require gently restraining certain individuals and resorting to hand signals to communicate and remind them of the loading plan. Keep in mind that you should never be in an approach position where you will end up walking downhill to meet the helicopter (or for that matter, walking uphill to get away from it). If the pilot throttles back, the blades of the main rotor can droop significantly. Remain within the pilot's field of view and maintain eye contact with him as much as possible. Watch his body language and any hand / head signals that may indicate to you to stop where you are.

If the terrain shape prevents a safe distant gathering point from being used, the next best spot to collect is right next to the landing stake or reference point on the away side. At this location you will be under the "umbrella" of the main rotor and out of harm's way. However, you will be on the opposite side of the helicopter from the door you need. Move slowly and deliberately around the bubble and avoid using any part of the helicopter for balance. Two items to intentionally **avoid** are **the antennae and the pitot**

**tube.** This stubby little tube feeds air pressure to the instruments (speedometer) and is hot enough to melt clothing and cause severe burns if used as a hand-hold.

When at last all the gear and passengers are on board, it is useful to have the last person aboard act as the **door man**, whose job is to perform a last check of the baggage and ski basket latches and assure that nothing is dangling outside of the machine. This person can easily shut the passenger door then get in beside the pilot. Communication on board will be through voice activated head-phones hanging overhead or mounted on the cabin bulkhead. Remember to take these off before you get out!

Before take-off there is inevitably a certain amount of jockeying for the **front passenger seat** beside the pilot. And for good reason – this is the prime time seat with the best views en route. Just remember when you're negotiating with your trip photographer that this seat should be reserved for the **navigator**, the party member who can confirm with the pilot what valley you're in or high col you're flying through and most importantly, where the landing is. This can be a big challenge from the middle rear passenger seat.

#### **Create safe landings / pick-ups:**

Although helicopters are amazingly maneuverable aircraft, several requirements must be provided for a safe landing. Some major factors to consider when locating and creating a landing site would include:

**Wind.** Helicopters gain their best lift when flying into the wind. As much as possible, orientate the landing so the machine will approach and take off into the wind. For one time impromptu pick-ups, an individual can take the place of the landing stake. In this case the individual's back is against the wind with the arms held out horizontally like twin flapping flags reaching for the incoming machine. During the final approach, it is important for this person to crouch down on one bent knee.

**Surface reference.** You can help your pilot to make a smooth landing if he has adequate ground features to fly to. On rough ground in good visibility there is usually enough **surface texture** for the pilot to estimate his approach speed and closing distance to the landing. On finer grained gravelly surfaces such as river flats or thinly covered alpine meadows, it will help to add reference. Items that will throw shadows and **create ground definition** such as a heavy pack or a small pile of head size boulders will help. Whatever you use must NOT blow up or away in the strong down-draft of the main rotor. The pilot will put the front toe of his skid (right side of the helicopter) close to this reference point. **On snow surfaces**, a flagged landing stake about a meter long is preferred. This can quickly be created by firmly inserting a long alpine ice axe or an inverted ski pole into the snow. Securely attaching a bandana or a short length of survey tape to this stake will help to indicate wind direction. At the same time it is useful to track up the surface. A letter "H" about 3 x 5 meters, boot-packed or scuffed into the surface and pointing into the wind will add to the reference and help confirm the landing area for the pilot. For a finishing touch, a half dozen visual markers spread out over a rope length along the likely approach path will help give the pilot a

better feel for the terrain. This is especially helpful in flat light or very bright light conditions.

**Flight path.** Unloaded, the helicopter may be able to descend or ascend in a near vertical plane. When loaded, a much less steep approach and take-off is required. In timbered or tight areas (e.g. cliff faces) allow a healthy margin of **distance for the machine to safely approach and climb out**. Consider at least five meters on either side of the main rotor disc. Be conscious of any standing dead timber or snags that may not be clearly visible to the pilot and consider the threat of “low-growth” shrubbery such as slide path re-growth or willow stands that may affect the tail rotor. Providing sufficient space for the tail boom to be swung through 180 degrees while hovering over the landing will allow the pilot the option of turning the machine around when he lifts off.

**Helipad.** Since the main rotor could strike the surface of any significant slope, it is best to find as **flat and wide an area as possible** to create a landing. Remove any significant surface debris (logs, boulders) in the area so that the skids can settle evenly. At the same time, this will reduce the likelihood of passengers from tripping when loading or unloading. Remove or be able to control any surface debris that could blow into the rotors. The perfect landing would be atop a slight rise or bump in the terrain where the ground falls gently away on all sides. Aspiring to this arrangement will keep the tail rotor free from any hang-ups.

#### **A final word – “Slinging”:**

Slinging, or suspending a load from the belly of the helicopter, may be the simplest way of transporting large volumes of cargo or when the cargo is oversized and of irregular shape. Slinging can minimize the amount of human activity otherwise required to internally load a machine.

The load is placed on a net and should be carefully balanced and stacked so as to settle rather than shift when the net is being lifted by the helicopter. Poorly prepared or over stuffed nets could mean that the net will not cinch properly at takeoff. This can potentially lead to spillage while airborne. Nets come in various sizes; your pilot will determine what is needed in advance.

The net is attached to the load hook on the belly of the helicopter via a cable. Cables come in varying lengths (either short lines – 6 feet long, or long lines – 50 to 150 feet long) depending upon the circumstances surrounding the landing. The cable attaches to the belly of the aircraft via a load hook. This can be released by the pilot from inside the machine.

It is difficult for the pilot to see what is taking place directly under his machine, especially when long-lining. It may be worthwhile in this case to consider a two-person ground crew. All other on-lookers should stand well away. One member will look after the hookup; the other stands some distance out in front of the machine and acts as a signal relay to the pilot. A prearranged set of arm signals or radio communication will simplify the operation.

A significant amount of **electrical charge** is generated by a helicopter and this can be increased due to rain or light blowing snow. To avoid receiving a stunning, but not harmful shock, the hookup person should resist reaching up to the machine or the cable as it hovers over the load. It is important to let the load or the cable ground itself first. Under some conditions the current can arc up to 20 centimeters.

Following these standard behaviors and maintaining a relaxed, methodical deportment around the helicopter will contribute to a safe, efficient and enjoyable outcome. Happy flying!