SAFE HELICOPTER SKIING

M. Wiegele

Introduction

Procedures for safe travel in avalanche terrain have been discussed in several publications (Gallagher, 1967; Williams, 1975; Perla and Martinelli, 1976). It is not the purpose of this paper to repeat well-known safety rules, but rather to comment on certain problems unique to running a safe helicopter skiing programme.

At the onset, we wish to point out that although helicopter skiing is conducted in the back-country, we believe it is possible to achieve safety standards comparable to those maintained within developed ski areas which also have serious avalanche problems (Alta, Snowbird, Jackson, Whistler, Lake Louise, etc.). A review of ski area accident records shows that avalanche fatalities in even the most hazardous ski areas are quite rare (approximately one fatality per 10^6 skier days) due to precautionary measures taken by ski area management. We believe that poorer safety standards in helicopter skiing are neither justified nor acceptable, and will now explain how high standards can be attained.

Choice of Site

This is crucial. The area chosen for helicopter skiing must consist of routes that expose clients to a minimum risk. If the chosen area is intrinsically dangerous (avalanche bowls, unprotected slopes, steep faces), then all other precautionary measures are fruitless. It is simply not possible to predict the behaviour of uncompacted or lightly-skied avalanche slopes to an accuracy that justifies exposing the lives of a dozen clients simultaneously. Even explosive tests are insufficiently reliable. Thus, the terrain must be relatively safe with ample opportunity to find routes that circumvent hazardous areas. Admittedly, it is not easy to find areas that permit both enjoyable and hazard-free helicopter skiing. The manager in charge of the operation will need to spend many reconnaissance hours flying over proposed areas, studying photos, skiing the terrain, and, in general, putting together a total package that combines safety and enjoyable skiing.

It is argued that clients demand an exciting area-- that they press hard to ski steep, avalanche prone terrain -- that high risks are part of helicopter skiing -- and that helicopter skiing is not viable without a high degree of risk. We do not hold to this philosophy. Avalanche starting zones require that a portion of the slope be inclined at least at 25°, and it is only in rare circumstances that a slab will release where the slope does not have at least a 30° portion (Perla, 1977). Even the most expert skier will find thrills and excitement on 20°-30° slopes. It is clearly unsafe to lead clients onto 30°- 40° slopes, where avalanche frequency is highest unless the slopes are adequately protected from avalanches. This is determined by slope geometry and density of tree cover. Moreover, there is no reason why helicopter skiing must provide only advanced, expert ski runs. There are enough potential clients who are content with a retreat from crowded ski areas, and the exhilaration of powder ski runs on moderate terrain.

The related problem is the traditional helicopter "bookkeeping" procedure where clients are guaranteed and charged for "x-number of vertical feet" (for example 100,000 vertical feet/week). Clearly, it is dangerous to over-emphasize any predetermined vertical amount since this encourages skiing steep terrain and skiing during marginal conditions. Worse yet, there is a great temptation to assist the customer to quickly achieve the vertical footage, and then begin drawing extra monies as the now addicted client tries to satisfy his "powder appetite". It is possible to reach a compromise in the "bookkeeping" procedure. Although a contract can be set for x-number of vertical feet, there should be neither competition nor chances taken to reach the limit. Appropriate refunds will have to be made when conditions do not allow the "vertical" to be achieved. It is also possible to operate without a "vertical" contract. True, the faster skier will have some of his week subsidized by the slower skier. However, the same situation exists throughout the ski-lift industry where daily lift tickets are priced to reflect an average level of activity and yet skier "A" may ride the lift 5 times more than skier "B", and is therefore subsidized somewhat by skier "B".

Guide Qualifications

We used the term "minimum risk". It is not possible to find a real world situation where there is zero risk. Ultimately, it is up to the guide to lead the clients around possible areas of hazard. Once again it must be emphasized that the best guide cannot work miracles if suddenly landed in a quagmire of avalanche traps.

Helicopter guiding is a highly demanding profession. Here are some of the key qualifications, not necessarily in order of priority:

a) Avalanche experience. The guide must be experienced in depth in all aspects of avalanche forecasting, control, and rescue. The prerequisite level of experience is only achieved by working at least one season in an avalanche safety programme (ski-patrol, Warden-service, snowranger, etc.), forecasting and controlling avalanches daily. It is hardly possible to acquire this level of expertise by attending a week-long training class. Rather, it can be expected that the guide who has chosen to work at least a season on a public safety programme attaches the highest importance to the safety and welfare of the clients.

b) Ski Instructor. The guide must establish a rapport with the clients. He must be alert, able to anticipate a problem, and able to react to prevent the problem from materializing. His guiding must have a certain rhythm that allows the clients to "let go" when conditions are hazard-free, but slows down the pace when the situation seems to be accelerating out of hand. He must be able to draw the clients back under his control at critical locations. He must be clear in his instructions. He must be capable and experienced in the traditional tasks of ski-instructing, including first aid, knowledge of equipment and technique, binding adjustment and repair, etc.

c) Mountaineer. The guide must be an accomplished ski-mountaineer, and, preferably, a fully certified guide, capable of reacting to mountaineering emergencies brought on by avalanches, weather, crevasses, helicopter breakdown, etc. He must be strong enough to ski with a full pack of rescue gear (15 kg), and have a proven record of functioning under the most adverse conditions. These abilities are usually only developed by year-round mountain guiding. Most important, he must know the area thoroughly, the hazards, the safe-routes, and how close to approach hazards without over-extending the party.

Client Orientation

For most clients, the avalanche hazard is a vague concept. Thus, it is essential that they receive instruction

as soon as they arrive. A first evening programme could consist of a mini-avalanche school including colour slides and lectures. The aim is not so much to scare the clients as to honestly involve them in the operational problems, to give them instructions in identifying unsafe terrain, and to discuss with them the daily hazard changes. It is not possible to operate a helicopter operation without keeping accurate records of snow stratigraphy, weather, and avalanche observations. These records should be shared with the clients who will respond favourably if they sense that your efforts are serious and professional.

Clients should be issued rescue transceivers, and should drill in transceiver techniques since it is known that practice results in a considerably reduced rescue time. However, it is essential that the following message be put across: Rescue transceivers are not a carte blanche to enter avalanche terrain -- they could help, but, at best, the odds are stacked 2:1 against the buried victim (see statistics compiled by Williams, 1975).

Despite the orientation, a certain percentage of clients will be uncooperative and unmanageable. Their helicopter privileges will have to be revoked.

Attitude

The pervading attitude of the operation must be safety. The guides' every thought and action must be dictated by the maxim that the client's safety is foremost. Management must be fully supportive of any guide decision that chooses a safe alternative over a risky alternative, and there must be definite communication of this attitude between guides and management. As the day progresses, guides and management should be in close communication with one another on observations, experiences, and hazard evaluation. A definite spirit of teamwork should make it clear that safety is the common goal.

This same theme must be present in management's planning of daily operational procedures inclusive of snow, weather, and avalanche observations, daily run selection, and the planning of emergency procedures.

Obviously, if management is pushing first for other goals (excitement, vertical footage), clearly the door is closed to the acceptable record of safety mentioned in the Introduction.

Conclusion

High standards of safety in helicopter skiing depend on a well thought out routine for daily stability evaluation, on safe route selection, on obeyance of known rules for safe travel in avalanche terrain, and on planning and executing emergency procedures. However, these efforts must be built on a safe foundation which includes:

1. choosing an area with minimum hazard,
2. selecting competent guides,
3. properly orienting the clients and
4. maintaining an attitude where the client's safety is foremost.

References

Gallagher, D. ed. 1967. The snowy torrents: avalanche accidents in the United States, 1910-1966. USDA For. Serv., Wasatch National Forest, Salt Lake City, 144 pp.

Perla, R.I, and M. Martinelli, Jr., 1976. Avalanche Handbook. U.S. Dept. Agric., Agric. Handb. 489, 238 pp.

Perla, R.I., 1977. Slab avalanche measurements. Can. Geot. J., Vol. 14, No. 2, p. 206-213.

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Discussion

DALY: Helicopter operations are strictly VFR. How many helicopter ski days can you average at Blue River, B.C.?

WIEGELE: We average 5 days a week of skiing.

KOEDT: You mentioned that you occasionally enter avalanche slopes in the track rather than the starting zone. Don't you feel that under some conditions it would be better practice to enter the starting zone and test or kick off slabs?

WIEGELE: First of all, if we have the slightest doubt about stability from our weather and snow studies, we do not go anywhere near an avalanche path. In any case, there is a much greater chance that a skier will trigger an avalanche in the starting zone than the chance that the avalanche will release naturally and spontaneously. If our professional avalanche teams feel confident about conditions, they may ski-test miniature starting zones, but we do not recommend leading clients into avalanche starting zones under any conditions.