

# A study of 4 avalanche accidents in Japan during '99-'00 season

Shinji Ikeda, Toru Maehara, Ryuzo Nitta\*, David Enright\*\*

**ABSTRACT:** During the '99-00 season, 4 fatal avalanche accidents occurred in Japan. 7 people were killed and 1 person is still missing. Our study points out the faults of safety measures against avalanches and the rescue system in Japan. In Japan, persons who are buried by avalanches are rarely found alive and often the victims are found in the spring or early summer after the snowpack has melted. These fatalities were caused by the following problems. 1) No effective public avalanche bulletin. 2) Light familiarization in the use of transceivers. 3) No public rescue dog system. 4) Rescuer's lack of avalanche hazard management skills.

**KEYWORDS:** Japan, Avalanche accidents, Rescue, Avalanche bulletin

## 1. INTRODUCTION

The trend of avalanche accidents in Japan over the last century changed in 1961, from predominantly industrial/transportation accidents before '61 to recreational accidents becoming more frequent after '61 (Fig 1. and Fig 2.). This trend is similar to the USA and Canada, and it is

anticipated that back country recreationalists hereafter will increase in Japan like they have around the world. Japan must prepare its recreationalists and rescuers for this trend. The purpose of this paper is to put a light on some of the present faults in safety measures against avalanches and the winter mountain rescue system within Japan.

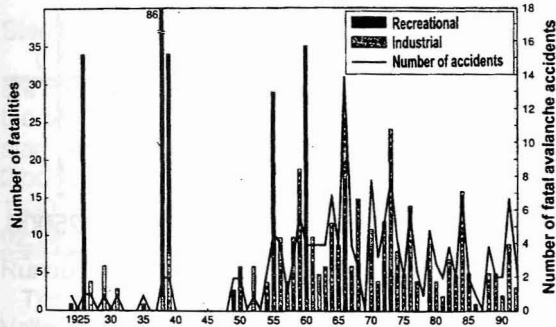


Fig1. Avalanche accidents, (Hokkaido/Toyama/Nagano 1924-1992) Fukuzawa, T. and others

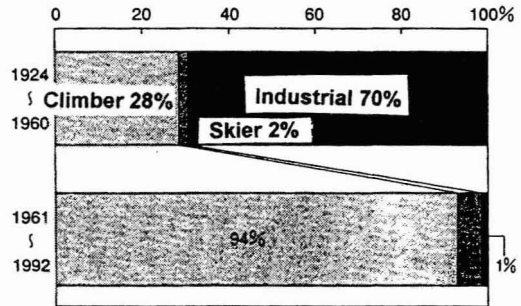


Fig 2. Comparison of industrial and recreational avalanche accidents before and after 1961. Fukuzawa, T. and others

\*Graduate school of Agriculture, Shinshu University, 829-64, Hakuba-mura, Nagano, 399-9301 Japan; Fax: (81)261-72-6414; E-mail: wanwan@m1.interq.or.jp  
 \*\*Canadian Outdoor Adventure Club Hakuba, 4213, Otari-mura, Nagano, Japan; Fax: (81)261-82-3545 E-mail: enright@wonder.ocn.ne.jp

## 2. ACCIDENT AND RESCUE SUMMARY

### STUDY CASE 1 Garagara sawa Valley, Nagano

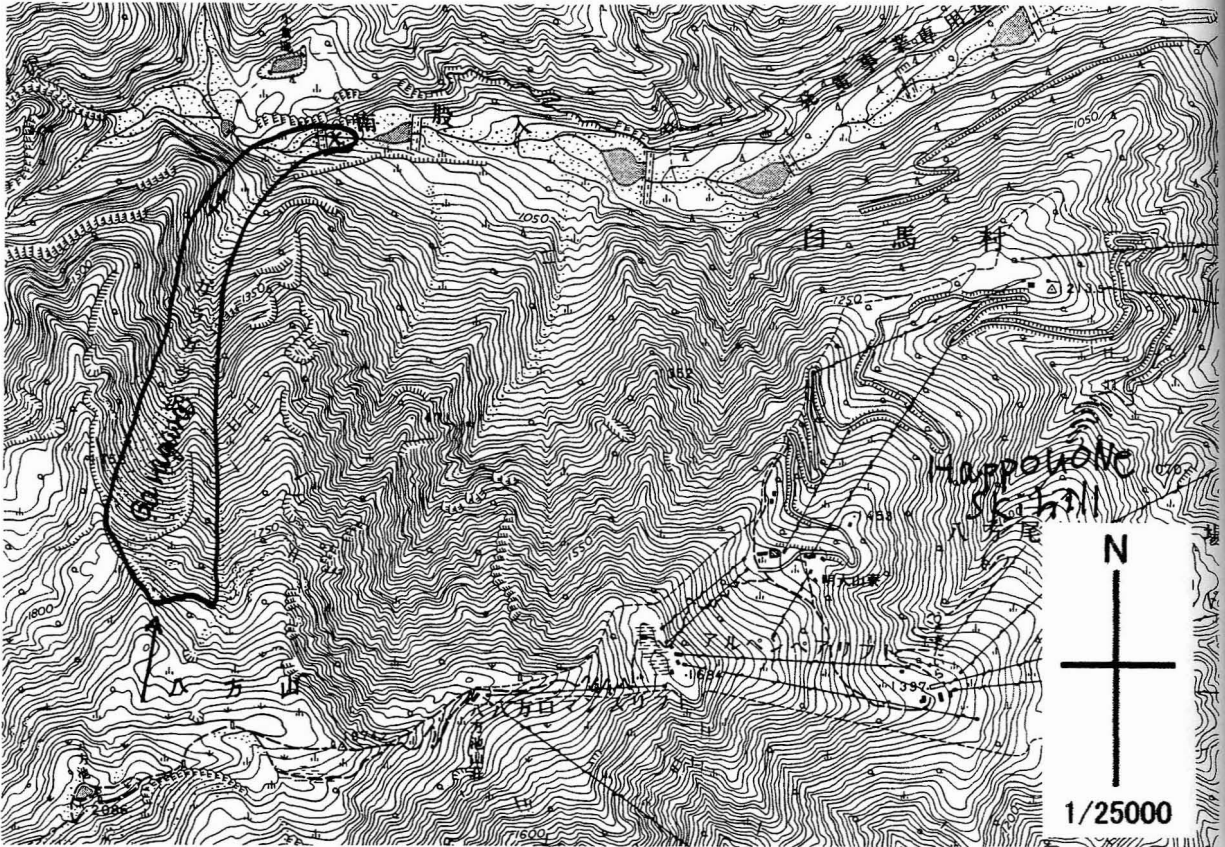


Fig 3. STUDY CASE 1 accident area map.

#### Accident summary

4 back country snow boarders triggered a class 3/3.5 avalanche and 3 people were caught and buried.

Location: Garagara Sawa valley, Japan Alps, Nagano

Date: 2000.02.19, 1430

Weather condition: Clear sky, light wind, mild air temperature after 3day snowstorm (heavy snow fall and strong NW winds).

Starting zone: 1900m a.s.l Happo One ridge

Runout zone 1100m a.s.l

Vertical drop 800m

Victims: 3 New Zealand back country snow boarders were killed. No transceivers.

#### Rescue summary

**02.19**

1430 The accident occurred.

1440 The accident was notified to the Happo Ski patrol by a separate party. The Happo patrol notified the police. A ground search was initiated by 2 members of another group and the 4th member of the victims party.

1600 Helicopter search initiated by the police.

**02.20**

0700 6 police tried to reach the starting zone of the avalanche but they could not find the location of the slide as a result of poor visibility.

1100~1400 Probe search by 6 polices and 8 volunteers (about 15m×80m)

1420~1500 Helicopter search by police

#### **02.21**

Runout zone

9 police and 5 local rescue team members and 15 volunteers were on stand by at the base of the valley but they were inhibited by thick fog and light snow fall. (deemed unsafe to search by local rescue team) 1000~1130 Dog search, one dog and trainer. (200m×200m)

Starting zone

3 police and 3 volunteers attempt to reach the starting zone. But they were prevented by extreme wind and visibility.

#### **02.22**

12 police went into the base of Garagara sawa Valley but did not attempt to search by ground because of poor weather conditions and suspected avalanche hazard.

1145 The police attempted a helicopter search but were deterred by poor visibility.

#### **02.23**

Runout zone

0930~1015 Searched by 9 police and 1 search dog with handler.

Starting zone

6 volunteers investigate the slide crown, but are requested not to enter below the start zone by the police rescue team. (No ground search from start zone to toe is ever done.)

2 police stayed on near the starting zone.

1030 Helicopter search by 2 helicopters.

#### **02.24~26**

Runout zone

The police went into the base of Garagara sawa Valley but did not attempt to search by ground because of poor weather conditions and suspected avalanche hazard. On the 25th and 26th helicopter searches were attempted.

#### **02.26**

End of the 1st search period.

The bodies of the three victims were spotted by police helicopter over a two months period in the spring. The first was found May 17th in the debris at the bottom of Garagara valley with minimal injuries. The other 2 victims were found at a point approximately 300 m from valley bottom in a deposit at a bend in the track.

## **STUDY CASE 2 Mt. Dainichi Dake, Japan Alps, Toyamama.**

Accident summary

Accedent occured when 27 ski mountaineers (participating in a National Mountaineering School training course) were taking a rest on a ridge at a point 16-20 m away from the cornice edge, the huge cornice under them failed with 11 members on top of it. This triggered a 4.5/5 avalanche and 2 members were caught and buried.

Location: Mt. Dainichi Dake, Toyamama

Date: 2000.03.05

Weather condition: we are uncertain of the conditions on the accident day, but this seasons snow fall was concentrated late in the season in the Japan Alps and the cornice was said to be significantly larger than in past seasons.

Starting zone: 2480m a.s.l near the peak of Mt. Dainichi Dake

Victims: 2 ski mountaineers, participating in a National Mountaineering School training course, were killed.

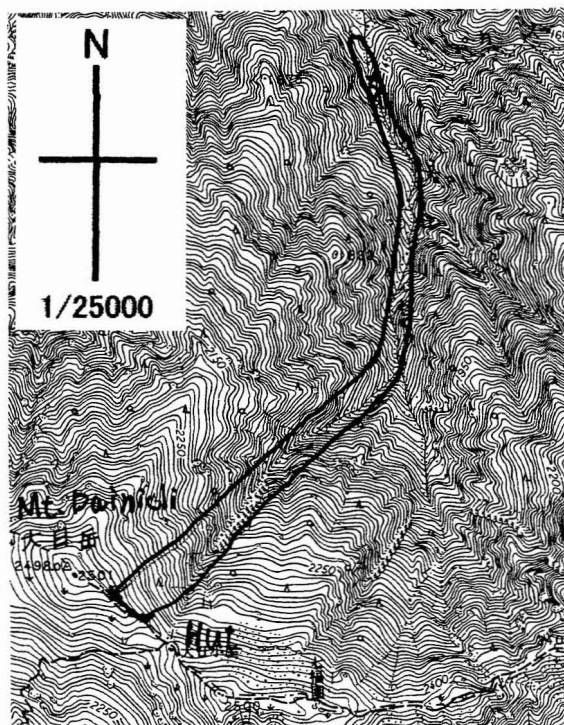


Fig 4. STUDY CASE 2 accident area map

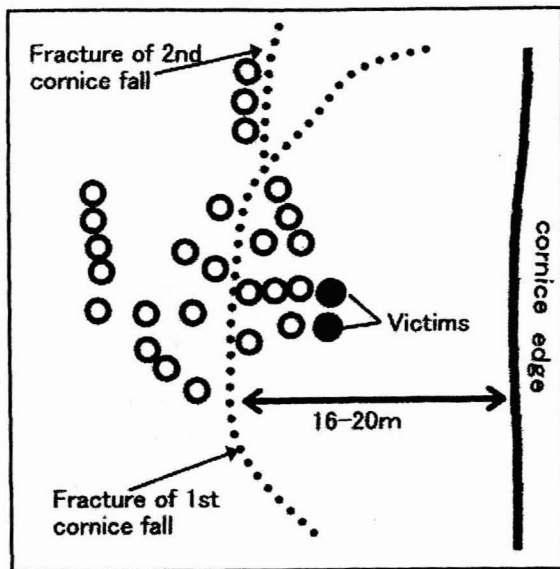


Fig 5. STUDY CASE 2 accident site layout,

#### Rescue summary

##### 03.05

1125 Avalanche is triggered by huge cornice fall.

10 instructors start transceiver and probe search from start zone.

1258 A police mountain rescue officer (rescue site commander) is carried by helicopter to accident site for inspection and site coordination. 13 police carried by helicopter to accident site and start transceiver and probe search at starting zone. Some instructors continue transceiver and probe search down avalanche track but they're efforts were hindered by another cornice fall adjacent to the initial cornice fall.

1300 The victims back packs and equipment were found by helicopter search on the track. Transceiver signal picked up at 1440 m a.s.l from helicopter. But secondary avalanche danger is judged as too high to allow ground searchers in to the area, which is situated in a depression terrain trap at the base area of the large steep walled basin rimmed with a huge cornice.

1752 3 rescuers injured by Second cornice fall. (1851 injured searchers evacuated by helicopter)

1808 closing of first days search.

##### 03.06

16 instructors and 14 polices were carried by helicopter to the accident site. But the area is

deemed too unsafe to proceed with a ground search as the secondary avalanche hazard is too great. Transceiver signal is picked up once again at 1440 m a.s.l by helicopter searchers. But the avalanche hazard is still judged as too high to search area as the burial depth is estimated at 7m judging from the signal from the transceiver aboard the helicopter. Some of the victims equipment was recovered by the helicopter crew in the area of the signal. Second search day finishes with 8 instructors and 10 police staying on near the hut.

##### 03.07~03.09

Search is prevented by snowstorm.

##### 03.10

The area with it's high avalanche hazard is deemed to dangerous to proceed with .  
Close of 1st period of search.

One victim was found July by transceiver (He used an Alpine Beacon 1500 with a 6V lithium battery and 1500 hour lifetime) and the other (He used an Ortovox F1 focus was not working when found) was found August after snow melt.

#### **STUDY CASE 3 Anagdani Valley, Gifu.**

##### Accident summary

A day before the accident there was a late season snow fall. The day of the accident two construction workers who were moving snow for the inspection of a new dam in the Anagedani valley, were caught and buried by a 4.5/5 naturally triggered avalanche.

Location: Anage Dani Valley, Mid Japan Alps, Gifu  
Date: 2000.03.27 1150

Weather condition: Day after late season heavy snow fall. mild, overcast day

Starting zone: 2700m a.s.l near the peak of Mt. kasagatake

Runout zone 1150m a.s.l

Vertical drop 1550m

Horizontal length 4600 m

Victims: 2 snow removal workers killed ( found at 03.30 ). No transceivers.

##### Rescue summary

##### 03.27

1150 No lunchtime contact to fellow worker.

Fellow worker concerned with lack of contact proceeds to work site to find avalanche scar and notifies base.

1330~2400 200 people and 15 construction machines search the area of probable burial.

##### 03.28

0500~0900 180 people and 15 construction machines search area.

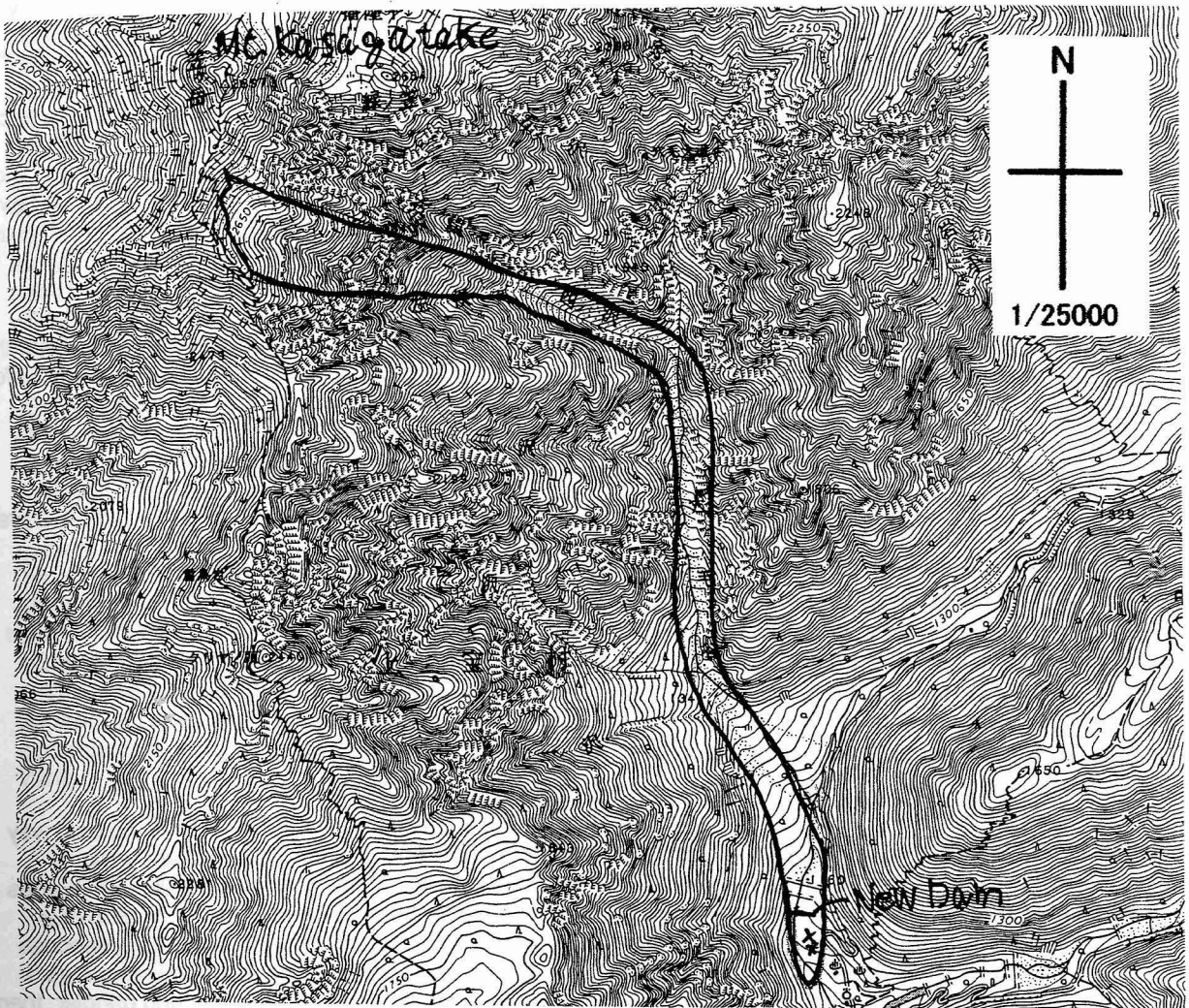


Fig 6. STUDY CASE 3 accident area map,

**03.29**

Safety check from helicopter, no ground search.

**03.30**

0330~1200 160 people and 4 construction machines and 2 dogs search accident site.

0645 One victim is found away from the snow removal machine.

1126 The other victim was found again away from the snow removal machine.

Note: They are not found by the search dogs but by trench style searching using back hoes.(scent of machine oil and hundreds of people a slight over load for the dogs)

**STUDY CASE 4 Mt. Niseikausyupe, Hokkaido**

**Accident summary**

Accident occurred while 4 climbers ascended Mt. Niseikausyupe. 2 climbers were caught and buried. 1 of these persons managed to undig themselves and the other was not located until July 2<sup>nd</sup>.

Location: Mt. Niseikausyupe, Hokkaido

Date: 2000.02.13 1025

Victims: One climber was killed. No transceivers.

**3. DISCUSSION AND CONCLUSION**

**3.1 AVALANCHE BULLETIN**

Three of the four cases looked at within this paper (STUDY CASE 4, conditions unknown.) were clearly due to a lack of precaution with in avalanche terrain.

STUDY CASE 1; snow boarding on a high angle

lee ward slope right after a large snowfall and high winds.

STUDY CASE 2; snow fall was concentrated late in the season and cornices were much larger than past seasons, yet the climbers were too many in such a small area too close to a cornice which should have been avoided.

STUDY CASE 3; The day previous the accident saw a late season snow fall which loaded the slopes far up the valley.

However, there was never any bulletin to precaution any of these parties nor was information spread generally within the mountaineering community about unusually large cornices. In Japan there is no public avalanche bulletin other than a constant avalanche warning that is posted from December through May, every day with no differentiating between high and low hazard. (Table 1.). The problems with this avalanche warning system are as follows; A; a lack of parameter. B; only two danger levels; CAUTION or NO HAZARD. C; bulletin nearly always indicates CAUTION during winter and early spring. D; Use of low elevation data collecting areas that have little or no meaning at elevation.

Table 1. Criterion avalanche caution Bulletin In Japan.

Area	
<b>Nagano</b>	
Surface avalanche	①snow depth $\geq 50\text{cm}$ and New snow $\geq 20\text{cm}/24\text{h}$ and Average wind speed $\geq 10\text{m/s}$ ②snow depth $\geq 70\text{cm}$ and New snow $\geq 30\text{cm}/24\text{h}$
Full depth avalanche	①snow depth $\geq 70\text{cm}$ and Max. air temperature $\geq$ usual Max. air temperature $+5^\circ\text{C}$ ②snow depth $\geq 70\text{cm}$ and rain fall
<b>Gifu</b>	
Surface avalanche	snow depth $\geq 70\text{cm}$ and New snow $\geq 30\text{cm}/24\text{h}$
Full depth avalanche	①snow depth $\geq 70\text{cm}$ and Av. air temperature $\geq +2^\circ\text{C}$ ②snow depth $\geq 70\text{cm}$ and rain fall
<b>Toyama</b>	
Surface avalanche	Snow fall $\geq 90\text{cm}$
Full depth avalanche	Snow depth $\geq 100\text{cm}$ and Daily av. air temperature $\geq +2^\circ\text{C}$
<b>Sapporo (Hokkaido)</b>	
Surface avalanche	New snow $\geq 30\text{cm}/24\text{h}$
Full depth avalanche	Snow depth $\geq 50\text{cm}$ and Daily av. air temperature $\geq +5^\circ\text{C}$

### 3.2 Transceivers

'99-00 season in Japan 8 people were caught by avalanche but only two of them were using transceivers. We don't know the victims avalanche knowledge but this fact is symbolic of a lack of knowledge and respect of avalanche danger and safety measures. It has only been in the last few years that magazines have been stressing the use of transceivers in Japan. Many ski hills with avalanche potential are not trained to operate avalanche transceivers at a professional level. With more and more people moving away from the ski hills and into the back country it is essential for Japan (as other countries) to create a greater awareness and respect for avalanches, and to increase public awareness of available safety equipment and its proper use. Yet still public opinion in Japan is that the Winter mountains are dangerous and Winter back country recreationalists only place a burden on the shoulders of rescuers. Thus the public do not encourage avalanche awareness training as it is seen as only encouraging excursions into dangerous terrain.

### 3.3 RESCUE

#### 3.3.1 RESCUE DOGS

It is certain that a dog search is the best way to search for buried victims who are without transceivers. Some individuals train search dogs but Japan does not have a public search dog system. The lack of an organized dog response system seriously hinders a speedy rescue as it takes far too long to locate a dog and handler, then to transport that search team to the accident site. STUDY CASE 1; A dog and handler join the rescue on the third day of the search. STUDY CASE 3; Two dogs join the rescue on the fourth day of the rescue after heavy machinery and hundreds of people had left their scent over the entire search area). Another serious problem is the policy of not using out of prefecture dogs and handlers. (STUDY CASE 1; A dog and handler were located and on stand by to assist on the second day of the search, but because it was an out of prefecture team it was not granted, with what might be equated to, search privileges.)

#### 3.3.2 RESCUER'S AVALANCHE HAZARD MANAGEMENT SKILLS

One of the most serious problems are rescuer's avalanche hazard management. STUDY CASE 2; 3 rescuers were injured by second cornice fall. In STUDY CASE 1; rescue was hindered by suspected avalanche hazard in a single track

valley that was slid clean. The area was only searched at the bottom of the valley with out inspection from the top, nor was there a snow profile dug to determine the stability above the area deemed unsafe to enter. Another example is STUDY CASE 3; where on the 1st and 2nd day 180-200 rescuers were searching at the accident site without enough an avalanche safety check, nor were transceivers used. Of course we all know avalanche safety judgment to be a difficult task but most of the time rescuers judge only terrain without enough snow condition data or other times use inadequate equipment such as thermometers installed on wristwatches to determine air temperature. So it is clear that Japan rescuer's knowledge of avalanche safety is far behind other nations with similar avalanche hazard. There is however a movement, however still small, to enhance the present system with training in avalanche awareness and forecasting, as well as the use of explosives in rescue situations. At the present there are only two ski hills in Japan that use hand charges to control avalanches and a handful more that use stationary propane cannons.

The laws are such that dynamite cannot be transported by helicopter which drastically hinders accident prevention and rescue efforts in the Winter mountains. It seems prudent that Japan

receive assistance, in restructuring their Winter mountain rescue system, from more progressive programs in Europe or North America. This would include systemized snow profiles and forecasting (bulletins), search & rescue/search dog protocol and explosive control training. With the support of outside influences and a willingness to restructure the present avalanche control and advanced warning systems along with increased experienced rescue training Japan, could over the next decade, produce an international standardized avalanche awareness and rescue system that would greatly benefit it's own people and the international mountaineering/recreational community.

#### 4. References

- Akitaya, E., M. Abe, R. Naruse, K. Higuchi, T. Fukuzawa, 1996: Update introduction to avalanche study. YAMA-KEI Publishers Co., Ltd.
- Jamieson, B., T. Geldsetzer, 1996: Avalanche Accidents in Canada Volume 4 1984-1996. Canadian Avalanche Association.
- Logan, N., D. Atkins, 1996: The Snowy Torrents Avalanche Accidents in the United States, 1980-1986. Colorado Geological Survey Special Publication.