

Chapter 16

Snowmobiles



Figure 16-1: Alpine I snowmobile.

The Mechanical Equipment Center (MEC) in McMurdo issues and maintains snowmobiles. You must attend a mandatory snowmobile maintenance course at the MEC before your field deployment.

Palmer Station has two Alpine 2 snowmobiles on station. The Station Mechanic is responsible for maintaining the machines. Refer to the following information for a description of the Alpine 2 and operating and maintenance information.

16.1 Snowmobiles in the McMurdo MEC Inventory

ELAN (275 lbs): A light-duty, 250-cc, Twin-Otter-transportable snowmobile which is not suitable for traverses.

CHEYENNE (350 lbs): A medium-duty, 503-cc snowmobile which is not suitable for traverses.

TUNDRA II (377 lbs): A medium duty, 287-cc snowmobile which is not suitable for traverses. Twin-Otter transportable.

ALPINE 1 (650 lbs): A heavy-duty, Twin-Otter-transportable snowmobile. Available with a 640-cc or 503-cc engine. It is suitable for extensive traverses and preferred for remote camp work. See figure 16-1.

ALPINE 2 (778 lbs): A heavy-duty snowmobile suitable for remote camps and traverses.

SKANDIC (750 lbs): A heavy-duty , single-track snowmobile with wide, long tracks. The Skandic is suitable for remote camps and traverses. It is not cleated and therefore is not recommended for travel on blue ice. Twin-Otter transportable.

All snowmobiles have two-stroke engines that require Mogas fuel pre-mixed with lubricating oil. The mixture is 50:1 (12 ounces of oil to 5 gallons of Mogas). Average fuel consumption when pulling a loaded (1,000 pounds) Nansen sled is approximately 7 miles per gallon.

Park snowmobiles facing into the prevailing wind and always cover them. This helps avoid getting snow in the points and accumulating snow under the snowmobile's cowling.

16.2 Snowmobile Troubleshooting

16.2a Fuel Flow Problems

Symptoms: Engine cranks but won't run, no fuel present in line from pump to carb. Engine may run briefly after priming.

Diagnosis and Cure:

1. Check fuel level in tank.
2. Pry fuel line off carb, pressurize the fuel tank (seal and blow into the vent line) to see if fuel flows out of the end of fuel line. Crank engine and see if fuel pulses out of the end of the fuel line.
3. If fuel flows and then pumps OK, the problem was probably just small ice crystals in the fuel pump valves. Pressurizing the tank dislodged them, thus solving the problem. Replace the line and go.
4. If fuel flows when pressurized but does not pump, the problem is fuel-pump-related. First, disconnect the vacuum pulsation line from the center of the fuel pump to the engine crankcase. Blow through the line. If blocked, clean ice out of the line with a wire. Check the nipples on the pump and crankcase for obstructions. If the vacuum line is clear but fuel still does not pump, replace the pump or remove it and let it thaw.

5. If fuel will neither pump nor flow, then either the fuel line or the fuel filter is clogged. Clean the fuel line or replace the filter.
6. If the tank is under vacuum when you open the filler, check the vent line for obstructions or pinches. Occasionally the line will rub against the exhaust, melting the vent hose. Make sure the tank is venting properly.
7. If all of the above steps have been tried and still no fuel flows, check the fuel line for cracks or holes, and look for any obvious fuel leaks (i.e., discolored snow) in the engine compartment. Repair or replace the fuel line.
8. A mixture of 30 ml of isopropyl alcohol per 5 gallons of pre-mixed Mogas will lessen the chance of water contamination and fuel icing.
9. Pouring fuel through a trail flag or rag placed over a funnel will help eliminate any snow contamination of the tank and will filter the fuel.

16.2b Starter and/or Cranking Problems

Symptoms: Engine cranks slowly or not at all when key is turned.

Diagnosis and Cure:

1. Usually this problem indicates a dead battery, and requires pull-starting the engine. The battery can be charged with an A.C. charger;

however, it should charge on its own with snowmobile usage, unless the battery is shorted or the rectifier is faulty.

2. If the battery is fine, check the in-line fuse (30 amp) in the red wire near the starter, or see if the red-green wire has slipped off the terminal on the starter solenoid. Finally, the starter itself may be faulty.
3. The recoil (pull) starter should be used when the engine is cold, so the electric starter is not overtaxed.

16.2c Spark Problems

Symptoms: Engine cranks but won't start. Fuel is present in the line between fuel tank and carb.

Diagnosis and Cure:

Unhook both spark plugs, push spare plugs into the wire caps, ground the metal plug bodies to the metal engine housing, and crank the engine. If a spark can be seen at the electrode of the spare plugs, the problem may be that the installed plugs were fouled with excessive fuel, ice, or a piece of carbon. Install new plugs or clean the existing ones. When the engine is cold, the spark may be hard to see in direct sunlight.

Caution: Do not remove the old spark plugs for this test. If you have a spark and the crankcase is full of fuel, an explosion and fire could result.

If a spark is not present, the problem is in the electrical system rather than the spark plugs. Check the kill switches and all electrical connectors. If they look OK, the solution to the problem depends on the engine type.

Elan engine: Problem is probably ice in the points (this usually occurs after exposure to blowing snow). Remove rewind starter and starter pulley, rotate magneto housing until upper point set is visible, spray with alcohol, scrape with file, spray with WD-40, repeat for lower point set, and reassemble.

All other engines: Electronic ignition - problem is probably the igniter box. Replace.

Any engine: Still no spark - may be a bad coil or a shorted wire.

16.2d Power Problems

Symptoms: Runs but lacks power.

Diagnosis and Cure:

If the engine seems to be running fine, but the snowmobile has trouble with uphill starts, the problem may be with the clutch-driven pulley. Remove the cowling and see where the belt is riding on the pulley. The belt should be along the outer edge of the driven pulley when the snowmobile is at rest.

If the belt is slotted down between the driven pulley halves (the driven pulley is the larger diameter of the

two pulleys), check belt width against a new one. If it's worn more than 5 mm, replace it. If not, remove belt to see if any foreign debris is lodged in the pulley. If neither of these situations is the case, consult MEC via radio patch; the driven pulley is probably severely damaged.

If the engine has very low power or dies when revved, remove the carb and check for ice. If ice is present, thaw out carb and reinstall. If the engine is weak and running rough but the carb is ice-free, the problem may be a bad spark in one cylinder. Follow the procedures outlined above for cleaning/replacing spark plugs.

Altitude Adjustment: Assess mixture by hill climbing performance and spark plug color. Chocolate brown is correct. A gray or white color indicates a mixture that is too lean, and black spark plug indicates a mixture that is too rich. From sea level to 4,000 feet, decrease the jet size by one increment from standard setting (i.e., 290 to 280):

- At 4,000 feet to 6,000 feet decrease by two increments.
- At 8,000 to 11,000 feet decrease by four increments.

Remember to richen up the mixture when returning to lower altitudes, under penalty of blown-up engines.

16.2e Track/Suspension Problems

Symptoms: Machine pulls to one side.

Diagnosis and Cure:

Check for loose or broken suspension components.

Each operator should be made responsible for checking their machine before use.

Daily: Check suspension, particularly when operating on glacier ice or sea ice. Look for broken suspension components. Check general operations on vehicle. On Alpine I machines, make sure the Bogie bungy is in place.

Weekly: Check for loose mounting bolts on bogies, skis (particularly the two bolts through the spring), rear suspension, and steering. A small suspension problem can rapidly get bigger (slashed tracks, broken bogie mounts, etc.).

Keep the track centered in relation to suspension. Watch the track tension. Check with MEC for specifications, since this varies from model to model. In general, if the track can be heard slapping against the frame tunnel while driving, it is too loose. Adjustments to both tension and alignment are made via long bolts at the rear of suspension.

Beware of loose trailing straps and ropes; they can get entangled in the tracks and around axles.

Be kind to transmissions and shift gently. If gear(s) will not engage, turn off motor, shift gears, and restart. Abusive shifting can cause drive train problems that are not repairable in the field. Never shift the transmission unless the snowmobile is stopped.

Note: LC-130 transport can result in snowmobile damage either from abuse or during loading. Supervise the loading and inspect your machines as much as possible.

Additional information on snowmobiles can be found at: <http://rpssc.raytheon.com/science/prospectus/Transport/snowmo.htm>