

Polaris toboggan used at SANAE.  
Photo: Hans Loods.



## TOBOGGANS IN ANTARCTICA

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Since 1964 two types of toboggans have been in use at SANAE; the Polaris K95 model which is now obsolete and the newer 2400 model. My experience has been largely with the latter. As I was in the maintenance section of the expedition, this article will deal more with the faults and troubles experienced rather than with the advantages of this means of transport.

The advantages and disadvantages of motorized as opposed to dog-drawn sledges were much discussed on the expedition. I feel convinced, however, that the advantages of motorized sledges outweigh their disadvantages as compared with dogs. The major disadvantage being a major breakdown in a remote area.

The K95 toboggan gives the impression of being a prototype rather than a well-planned machine. The idea of having the main weight supported on runners or skis which are unsprung with the track solely for driving, appears to be outmoded. The vehicle at SANAE proved to be very reliable if rather bumpy and slow. Starting in cold weather was the cause of much sulphurous language in spite of preheating and the use of multigrade oil. The fact that the engine is completely unprotected from the wind made effective preheating very difficult. The diaphragm in the fuel pump would stiffen in the cold to the extent that it would not pump fuel. On soft surfaces the track would dig in and the machine would have to be pushed and dug out of the hole it had made; again amidst many uncomplimentary comments by all concerned. After each storm the track and steering mechanism had to be cleared of drift snow before the machine

would move under its own power. Generally speaking, the harder the surface the better. No great distances were covered on blue ice, but it operated very well where blue ice was encountered, apart from a noisy and spine-jarring ride. Other points which required attention were the windscreen frame which was reinforced and the tow bar which was also reinforced. During the combined South African Belgian expedition, it was necessary to airlift the South African and two Belgian K95's. These were found to be awkward to strip and both cumbersome and heavy to load into the Otter aircraft used. It was very difficult to load a complete, although stripped toboggan into the aircraft. Usually the motor-track assembly was taken on one trip with other camp equipment and the bodywork and runners on a separate trip. This led to delays in the field, whereas if the complete machine could have been loaded, persons in the field could have used it soon after arrival. Fuel consumption was about 7 km per imperial gallon with a full load.

The Polaris 2400 was considered to be well designed and was faster and more economical on fuel than the K95. The major criticism being that the construction was too flimsy. The two-stroke motor started relatively easily with a little help from a blow torch in temperatures below minus thirty degrees Celsius. Mixing fuel for a two-stroke is always messy and was made more so by the oil not mixing with the fuel in low temperatures. The mixing had to be done gradually and the mixture very well shaken or stirred before the oil would combine with the petrol.

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All the bogie suspension struts had to be rewelded. The track bearing supports at the rear tore out and new modified pins had to be made and fitted, after this fault had caused the cancellation of a field trip. The wind-screen proved no match for the Antarctic winds and disappeared during a storm early in winter. The fuel tank had to be constantly repaired. This caused estimation of fuel requirements to be a rather chancy business. A larger capacity fuel tank is required. The catches on the engine cover proved virtually useless both because of their inaccessible location, particularly for gloved hands, and also because shrinkage of the cover in the cold prevented the two sections of the cover from mating.

The noisiness of the exhaust was found to be a drawback. A more efficient silencer would be appreciated. If a passenger wished to stop in an emergency, it was practically impossible to attract the driver's attention because of the noise. The driver would proceed merrily, unaware of the crisis brewing a few feet behind him.

The 2400 operated well on soft surfaces and numerous thin snow bridges were crossed without mishap, thanks to the low ground pressure of the broad track. On blue ice the toboggan was completely uncontrollable. Special track cleats with spikes or some sort of grouser plates would be a solution here.

This machine was found to be very easy to airlift in the Otter. It was only necessary to remove the steering skis (one bolt each) and to disconnect the handlebars (two bolts) and the whole of the machine could be lifted by three men. (On occasion, two men were found to be sufficient.)

The track and bogie wheels also had to be cleared of snow after every wind, before the toboggan could pull off under its own power. The engine cover seemed to be more effective as a snow collector in storms than as protection from wind, but helped a great deal as protection when travelling.

The vehicle was operated for most of the time without a windscreen and as there was only a hand throttle available, the driver suffered considerably from a cold right hand, as the moment the throttle was released the machine would, of course, come to a standstill. The fitting of a foot accelerator would be greatly appreciated under these circumstances.

It was necessary to decarbonise the exhaust port only once during the year and this was probably largely due to the fact that the motor was run most of the time on the wrong type of oil, as no two-stroke oil was available. This operation took about one hour to perform, as the motor is very accessible. As no spare spark plugs were available, it was also operated for most of the time on the wrong type of plug, which possibly also caused carbon to form prematurely.

Although the toboggan can seat two, it was found advisable for only the driver to ride on the seat, as the carrying of a passenger caused the suspension to bottom over the slightest unevenness. The extra space was considered better used when carrying extra fuel which was transported in two jerry cans, one on either side

of the seat. Fuel consumption was about nine km per gallon when pulling a heavy load.

The sledges used with the toboggans were the heavier type of Nansen sledge and were found to be not very effective, because their narrowness made the loading of items such as food boxes (paraffin boxes) and jerry cans very difficult. During the second summer, one sledge was modified to the full width of the 2400 toboggan and was also reinforced. This sledge was used extensively by the surveyor to transport bulky items such as empty fuel drums for marking points and proved effective and much more stable than the normal Nansen. It is recommended that where extensive use is to be made of toboggans, that the wider sledges be used. Either the existing ones could be modified, which entails virtually complete rebuilding of the sledge, or preferably, wider sledges should be made.

Unfortunately no first hand experience was had with this modified sledge in the field, but persons who used it found it to be effective.

It was found best to tow not more than two sledges on a trip as more than one was difficult to control on a steep slope, particularly when travelling obliquely across a downhill section of country. The sledge would overrun the toboggan, turn sideways, and then be jerked onto its side as the toboggan took up the slack in the tow rope. One effective way to combat this trouble was to manoeuvre the sledge onto the uphill side of the toboggan and, resting against it with the passenger on the sledge holding onto the toboggan, the sledge could then be handled as a unit and was completely controllable. Naturally, at all times watch had to be kept on the tow ropes to prevent their becoming entangled in the track. This did happen occasionally and the difficulty of freeing the rope had to be experienced to be believed.

Both types of Polaris could do with a rack or some provision for carrying items such as skis and marker poles as well as convenient storage place for all the loose paraphernalia essential in Antarctica. Things such as a compass, binoculars, cameras, spades and a few loose tools are difficult to transport. The stowage space provided in the nose of the K95 and under the seat of the 2400 was normally taken up with spare parts, rope, kerosene, a blow lamp and ether (for cold starts), and this space on both vehicles tended to collect snow and ice so that when any article was required it would first have to be chopped free.

It is considered inadvisable to operate the Polaris, even on short trips from the base, without pulling a sledge on which camping equipment (tent, sleeping bag, primus with fuel and a pot) and emergency food are carried. A Verrey pistol with cartridges should also be carried.

Some method of charging a battery from the motor would also be a distinct advantage as at present a portable battery charger has to be taken on field trips in order to charge the radio battery. Use of the hand-cranked radio generator is very inconvenient and requires two men. If one man of a two-man field party were to be injured, this means of radio contact would be ineffective.