Constructing in Antarctica, 10,000 Miles From Home

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In the fall of 1988, Keith Byram, President of Pelly Construction noticed a small advertisement in the Journal of Commerce that the British Antarctic Survey was looking for a contractor with cold weather experience to construct a runway in Antarctica.

British Antarctic Survey, "BAS", is the British Government Agency that conducts research on the continent of Antarctica. BAS has some small stations scattered around the edges of the continent. The main station is located on the Antarctic Peninsula at Rothera Point on Adelaide Island, approximately 1000 nautical miles south of Cape Horn. Rothera is about as far south that ships can regularly go to deliver scientists and goods. Adelaide Island is covered with several hundred feet of ice except for Rothera Point that shows some bare rock in the Austral summer.

The base at Rothera Point was established by BAS in approximately 1970. A small staff is on site year around. During the "summer" months from mid December to mid March, scientists travel to the base and do a variety of research projects. The traditional way to get to Rothera is by ship from England. Many of the research projects involve traveling into the interior and in the early days this was accomplished with dog teams. In later years, the summer staff would fly to the Falkland Islands and then travel from there by ship to Rothera. BAS established a snow runway on the ice cap and would fly into the interior with ski equipped DeHavilland Twin Otter aircraft. Maintaining an air operation on a wind swept glacial plateau was not very satisfactory.

An engineering consultant from Winnipeg, Canada, IDS, designed a rockfill runway with a surface a couple of meters above sea level. The runway started in the ocean on one side of Rothera point, ran across the point and ended in the ocean on the other side. The primary construction consisted of drilling and blasting a granite outcrop for use as embankment fill and rip-rap material. The runway was finished with a crushed rock surface. A hangar, six 50,000 gallon fuel tanks, a new pump house and water distribution system rounded out the package.

Pelly Construction wrote to BAS and indicated an interest in the project and early in May Norm Kelly and Keith Byram accepted the invitation from BAS to attend a briefing at their headquarters in Cambridge, England. Most of the large British contractors that attended expressed the opinion that the job could not be done on a firm unit price contract and would have to be performed on a cost plus basis. BAS and their consultant determined to go ahead on a normal construction pricing basis. Pelly Construction and three other companies were eventually invited to bid on the project. The invitees included one British, one Dutch and one other Canadian company.

Each company was allowed one representative to attend a site visit. Keith Byram attended on behalf of Pelly. The group of four contractors plus a representative from the consulting firm I.D.S and a BAS member met in England in March 1989 and made the eighteen hour jet trip to the Falklands. In the Falklands the group went on board the John Biscoe, a BAS research ship to make the ten day trip around Cape Horn and down the peninsula to Rothera. Three days were spent on site and the group then proceeded to King George Island where a flight to Punta Arenas was arranged on a Chilean Air Force Hercules. The round trip from Whitehorse and back took a total of twenty two days.

A bid was prepared and was hand delivered to Cambridge in June, 1988. BAS did extensive interviews with all four contractors after the bids were received and eventually Pelly was advised that they were the favoured bidder. Several more meetings took place to discuss the work and it was not until September that the project was awarded.

Subcontractors engaged for the work were: the hangar, fuel tanks and pump house to TSL, the catering to Cando and the earthworks to Pelly Group International of Barbados.

It was essential that as much as possible of the 89 – 90 season be utilised. BAS normally have most of their summer crew out by mid March. BAS was slow to make a formal award of the contract and in order to meet the timing allowed by the narrow weather window it was necessary to do considerable planning before the work was awarded.

BAS was to provide no support for the work so that everything required for the two season project had to be loaded and transported on one ship. One of the main problems that had to be solved was the transportation of fuel. An estimated 1,200,000 litres of fuel was required. A British shipping agent and a Canadian shipping agent were engaged to help in the search for a suitable vessel. Anglo Canadian of Vancouver located a ship owned by Bostroms of Sweden. The ship, the Columbialand had been built with an extra large amount of fuel storage capacity. They were able to devote enough of the capacity to take the required amount of fuel required for the project in their tanks. The ship had cranes that could be twinned to lift a maximum of 50 tonnes.

Provision had to be made to transfer the cargo ashore as there was no facility to tie up a ship at Rothera. It was decided that a tug boat be purchased and be transported in a cradle on the deck of the ship. The tug, “Nanaimo Flyer” met one of the prime requirements, it weighed 50 tonne and could be lifted and set in the water with the ships cranes into the water when it arrived at Rothera. In addition, Bostroms brought a slightly smaller tug from Sweden. Rendrag barge sections were located in Texas and enough sections were purchased to make up two barges 40 ft by 90 ft. The barges were mainly 10 ft by 40 ft by 5 ft deep sections with some 20 ft by 10ft sections and 10 by 10 ft bow sections. The sections were such that they could be pinned together in any configuration.

The construction equipment consisted of mainly Caterpillar equipment, three D-9 dozers, one 14G grader, five 769 rock trucks, two 235 excavators, one 245 excavator, two Atlas Copco rock drills, a Bucyrus Erie 30 tonne crane and support equipment. In addition to the mobile equipment, a 70 bedroom camp, kitchen, recreation trailer and a power generation van was included. One hundred and ten, twenty and forty foot containers were filled with food, explosives, spare parts, lubricants, hangar and pump house material, and miscellaneous supplies. A month was required to move the supplies from Vancouver to Rothera and of course the equator had to be crossed. Four refrigeration containers were obtained and were plugged in to the ships power supply. Two were kept at a cool temperature for fresh perishables and two were filled with frozen food.

It was originally planned that the ship would land at Skagway Alaska, the closest port to Whitehorse and pick up the construction equipment but in the interest of saving time the mobile equipment was barged from Skagway to Vancouver.

The ship was loaded at the Fraser Surrey Docks in Vancouver and sailed on December 9, 1989. A stop was made in Valparaiso, Chile to take on bunker fuel and it arrived at Rothera Jan 10, 1990.

Keith Byram and small crew of equipment operators and surveyors, as well as, three of the consulting engineers made up a party of ten people who set out from Punta Arenas on New Years day 1990 for the Chilean base on King George Island aboard a chartered DC-6. Half way across the Drake Passage one of the four engines failed. The weather was deteriorating at King George so the aircraft returned to Chile. A new engine was installed and a couple of days later a successful trip was completed to King George. The leg from King George to Rothera was made by a chartered Borek Air, Twin Otter that had been brought from Calgary. A Twin Otter does not have the range to fly personnel across the Drake but was used to ferry the crew from King George to Rothera where the craft landed on the ice cap some 5 km from the construction site. People, luggage and supplies were then transported to the base by double track snow machines and sledges.

When the ship arrived off of Rothera the first task was to lower the tugs into the water followed by the barge sections. The unloading continued around the clock for nine days while the ship maintained its position about five km off shore. The cargo was transferred to the portable barges with the ship's cranes. The barges were pushed ashore and landed on a small gravel beach. Large items such as camp units were transferred to the required location from the barge on specially designed steel skids. The 988 Loader had forks and could handle 20 tonne containers. When all of the equipment and supplies were ashore, the diesel fuel was pumped from the ship's tanks into the barge sections. From the beach, the fuel was then pumped to the fuel storage area into four ninety thousand litre bladders. When the bladders were full, some of the barge sections were unpinned and placed in the fuel storage area where they were pumped full of fuel. By the time the fuel was all ashore most of the barge sections were on shore full of fuel and the barge was reduced to a very small craft. In planning the operation an attempt was made to have an alternate method of performing all of the essential tasks. Several hundred feet

of high strength rubber hose was included as an alternate to barging the fuel but was not used.

When the ship stopped in Chile for fuel, twenty five personnel that had been flown to Chile from Canada were put on board while another twenty five were flown on the DC-6 to King George. The latter spent a few days stuck at King George on short rations as the weather between King George and Rothera was such that the Twin Otter could not make the trip.

The first priority when the goods started to come ashore was to set up the camp. Drilling the rock was started immediately and the first blast was set off before the ship was completely unloaded.

Satellite phones were a fairly new phenomenon and one was set up to provide phone and fax communication. It was a bulky piece of equipment with a dome that was more than two metres in diameter.

The work went well and by the time all personnel had to be transported back to Chile in early April, much of the runway was roughed in and the shell of the hangar was erected. By the time the last of the crew left in mid April and the generator was shut down, it was cold enough that the frozen food needed for the second season did not require artificial means to keep it from spoiling during the nine month absence.

The second season got underway in mid December of 1990. Some of the people were transferred via the Chile, King George, Rothera, air shuttle and some were taken by a chartered boat. The ones that crossed the Drake by water had an unforgettable experience. The water in this area, where the Atlantic and Pacific Oceans collide, is recognised as the roughest water in the world.

During the period between seasons a joint effort between BAS, IDS consultants and Pelly, produced a design for a wharf that could be constructed utilizing the equipment that was on site. It was essentially a steel box that was anchored with 50mm dwydag rods into the granite ocean floor. The rods were grouted into drilled holes with a special quick setting grout that was developed for the Canadian Arctic. The steel required for the construction of the structure and a jaw crusher that was used to make the minus 15mm backfill were obtained in Europe and loaded in Belgium on a new combination passenger/freight boat that was on its maiden voyage to the Southern end of the earth.

The construction of the wharf was hampered by a continual flow of small ice pieces called bergy bits and occasionally by larger burgs that had to be eased out of the way by the tug.

During the second season, the runway was completed sufficiently that a chartered King Air with long range tanks was used to transfer some personnel and supplies directly from Chile to the site.

All of the equipment and surplus supplies were required to be removed from the site. The main difference for the return voyage was that there did not have to be provision to transport fuel so that a smaller ship, the Prinsengracht, was utilized. The loading was done at the new wharf in record time. Everything was loaded and chained down in three days, one third of the time that it took to load in Vancouver with sophisticated lifting equipment and experienced long shore men. Thirty days later the cargo arrived in Skagway and the project was declared complete.

The project was a family affair. Keith acted as the team leader, his wife Gwen and daughter Lori stayed in Whitehorse to pay the bills and keep the home office going. Karen looked after the logistics in Punta Arenas and management of Pelly Group International. Jennifer multitasked at the site, both seasons, operating the crusher controls and a myriad of other on site duties.