

On the Construction of Shelter Accommodation within C & N Hangar, Dakshin Gangotri, Antarctica

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Introduction

Dakshin Gangotri (DG), the first Indian Antarctic Station was decommissioned and converted into a supply base during February 1990. Since regular wintering convoys would visit the station for ferrying the fuel and other cargo, it was envisaged to construct a 'Transit Accommodation' for eight personnel, within the existing C&N Hangar at DG. This hangar, constructed during the Fourth Indian Expedition in 1984, to serve as a vehicle shelter and completely buried in the snow at present, is a well designed unit equipped with all communication facilities.

Plan

The original plan (Fig. 1) was to construct living accommodation inside the hangar and service complex outside the hangar. There were two containerised generators which were to be connected to the service complex. The service complex itself consisted of bath and toilet module, fuel storage module and generator passage unit. A link block between hangar and service complex was also planned. Due to site conditions and availability of only one generator, the original layout was slightly modified. In revised layout (Fig. 2) the link block was directly connected to the entrance. The generator was detached to avoid snow accumulation. The crawl duct was made straight so as to leave the effluent at about 20' away from the existing structure.

Transportation and Stacking of Stores

The transportation of stores from the ship was not much of a problem as quantum of load was only about 45 tonnes. Though the foundation material was kept on deck, the superstructure packed in crates, was all in hold.

The first sortie to DG went on 29.12.1989 with foundation material. By 19.01.1990, all the stores were shifted to DG. The stores consisted of bulky items along with some heavy items. For optimum utilisation of the aircraft capacity, the bulky items were combined with heavy items. The stores were unloaded as close to the site of construction as possible.

The stores had to be stacked on ramps to avoid the snow accumulation on it. The stores for living complex had to be shifted inside the hangar through the ramp of C&N Hangar.

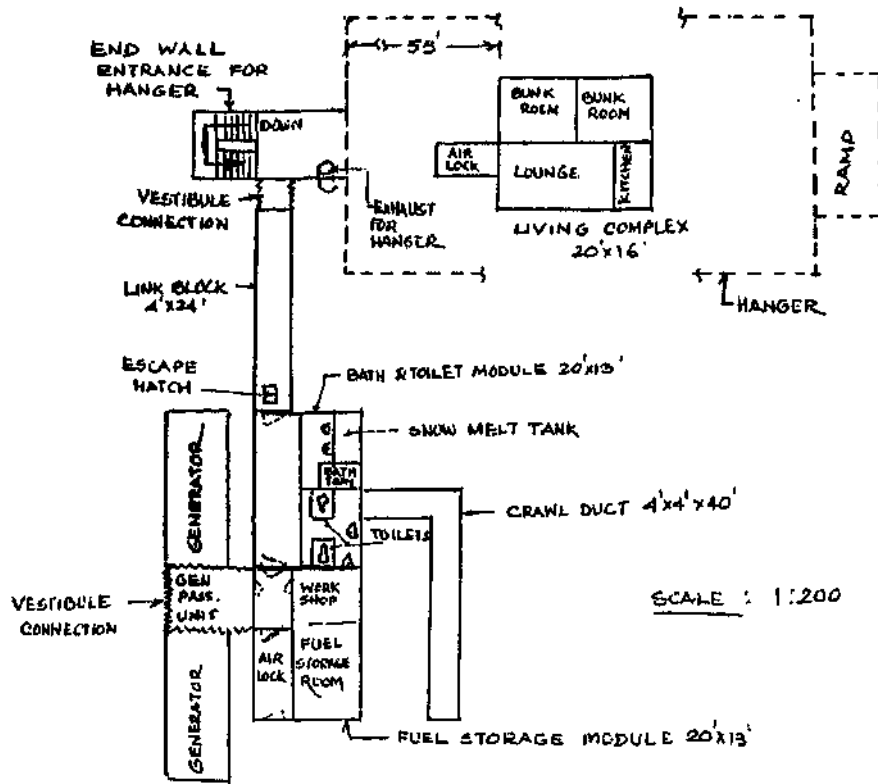


Fig. 1., Sketch showing planned layout of shelter accommodation in C&N Hangar, D.G.

The foundation stores were manually carried through the door inside, since the ramp was not opened then.

Construction

Rough levelling of site was done with the help of snow vehicles and final levelling was done manually. Raft foundation was left for one day for any settlement of loose snow on top.

The supporting steel frame was placed on the raft foundation and the construction of superstructure for link block module, bath and toilet module and fuel storage module started.

By 23.01.1990 complete superstructure was erected. The work on installation of snow melt tank was also completed simultaneously. The fibre glass roof and the inside structure i.e. living complex were completed by 28.01.1990.

The most important job of water supply and sanitation was then taken up. Electrical work was going on simultaneously. The shelter accommodation complex (Fig.3) with all its amenities was completed by 16 Feb. 1990.

Difficulties Faced

The problems faced were as under:

1. Due to filling of snow in foundation, there was differential settlement. The packing had to be provided frequently.

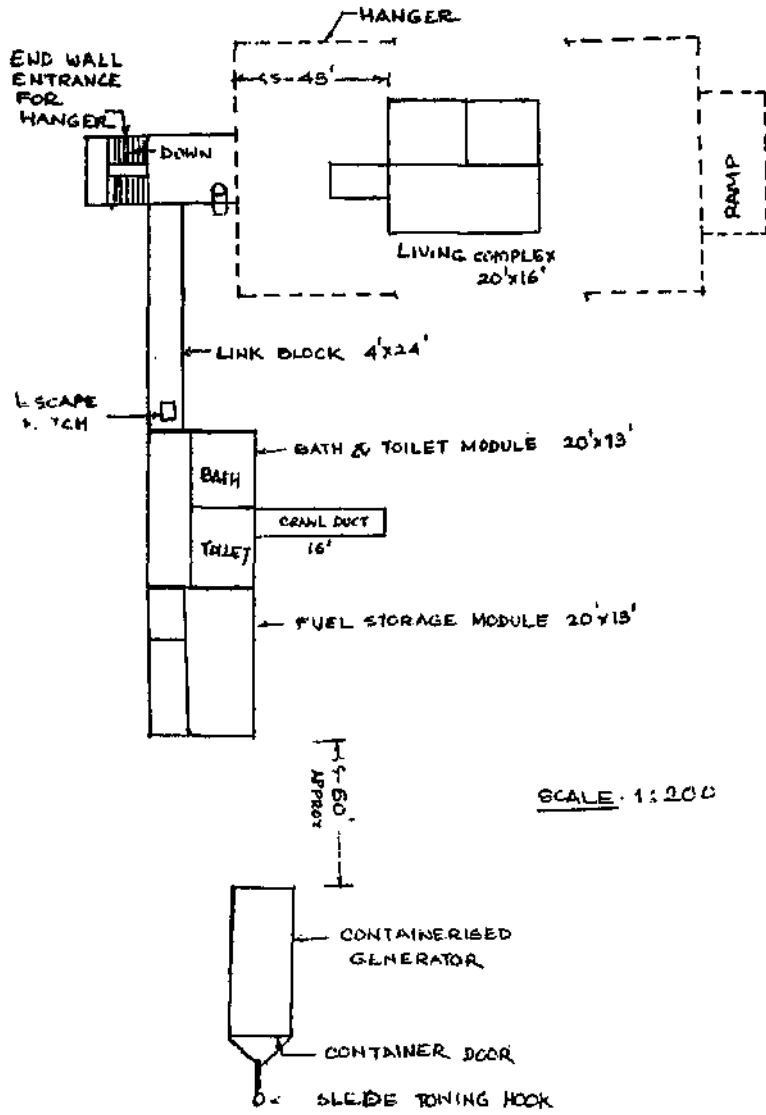


Fig. 2. Sketch showing revised layout

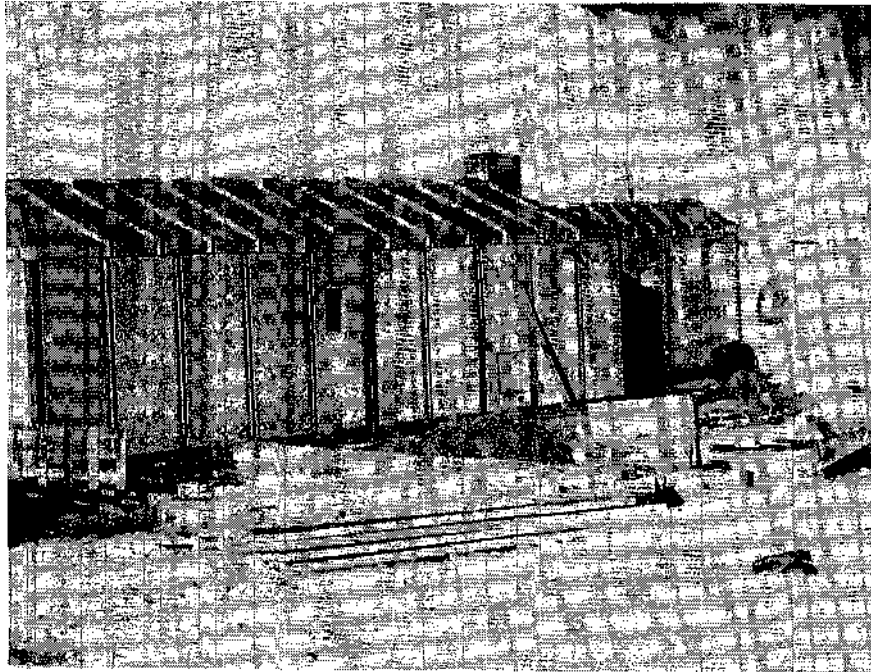


Fig. 3. Service module at C&N Hangar site, D.G.

2. Due to position of the living complex and bath of toilet module, the plumbing was difficult. There were lot of bends which made trace-heating difficult.
3. Gaps develop in panels if the foundation is not levelled. To avoid this, perfect foundation levelling had to be done.
4. To stop the ingress of snow, lot of sealing was required since every module was an independent unit.
5. The electrical work should have been done with Teflon cable, though expensive, to avoid short circuiting during winters.

Conclusion

In conclusion it may be added that with some more information about site conditions the planning would have become more easy and better facilities could have been provided. After observing the conditions on the shelf it was felt that the accommodation built on sledge would have been more effective and economical as it can be retrieved and relocated as and when felt necessary.