

Toilet provision in the Cairngorms National Park, Scotland, U.K.

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About the author :

John has been a director of the ecological water purification company “Living Water Ecosystèmes” and is now finance director of The Melting Pot, an incubator for social innovation in Edinburgh. John has been a computer software consultant for the past 25 years, has worked as professor of physics in California, and as a consultant in the heart pace maker industry (Australia, UK, France). John is also co-founder of the Beauchamp permaculture centre in S.W. France.

Abstract

A presentation of three toilet systems installed in the Cairngorms National Park, Scotland.

The National Trust of Scotland, The Cairngorm Park Authority and Mountain Bothies Association (MBA) have worked in association to resolve the problem of the accumulation of human waste at “bothies” – open refuges located in the Cairngorm wilderness area.

As a director of Living Water Ecosystèmes, John Cant designed a toilet system based on geotextile bags and drainage to a soakaway. The system has been running for one year and the results of analysis are beginning to appear. During this time, over 150 kg of faeces have been stored in a specially built structure and has thereby saved the surroundings of the Corroul refuge from further pollution.

The anticipated problems of maintenance in a situation where MBA personnel visit less than once per month – access takes at least 3 hours by bicycle and foot from the nearest road - have been minimal, indicating that serious users of the refuges are well motivated to look after the facilities that have been provided for them by the MBA – an organisation run entirely by volunteers.

Two other toilets facilities are of interest. One is composting toilets based at the public car park to the south of the Cairngorms, and the other is a septic tank system located on the ski slopes to the north west where skiers and climbers are encouraged to use specially designed plastic bags and containers. Such users drop their contributions into a chute that leads to the septic tank where the special bags decompose rapidly, releasing their contents into the septic system.

John Cant attended the previous Dry Toilet conference in Tampere.

Designing an experimental toilet for Corroul bothy.

Toilets at bothies are not unheard of - Ruighaiteachain in Glen Feshie has had a flush toilet and septic tank in place for years, Bob Scott's beautifully renovated bothy at Derry lodge has a septic tank, and the Linn of Dee car park has two composting toilets.

When it came to installing a toilet at Corroul, we initially thought it would just be a case of choosing the best technology for the job. Water flush toilets and septic tanks are well known, but they depend on having a supply of water, ease of access to install and empty the septic tank if necessary, and ground conditions to permit digging a big hole to take the tank.

Composting toilets are arguably the best technology for treating human excreta in all circumstances. Instead of polluting and wasting valuable water supplies by using water as a transport mechanism, the contributions are composted on-site and the proceeds are returned to the environment as a valuable manure.

A composting toilet works by having visitors add a handful of soak after each use, the soak being an absorbent carbon-rich material like sawdust or peat. The soak covers the contributions and keeps the pile aerated, reducing smells, and balancing the high nitrogen content of urine, making for a perfect mix that will compost itself, given half a chance.

The best-known composting toilet – the Clivus Multrum – is built as a vault with a sloping floor and a capacity about three times the volume of the yearly contributions. The contributions slide gently down the floor towards the exit, mouldering away in the process. If everything works perfectly, the vault never has to be dug out.

A more basic possibility is the VIP toilet – the ventilation improved privy : a hole in the ground with a seat on top and a vent pipe. When the hole is full, it is sealed and another one dug elsewhere.

For Corroul we quickly ruled out a flush toilet. We would never get a septic tank safely installed in the unremitting bog, and we couldn't rely on a supply of water in the depths of winter. We also had to rule out a composting toilet due to the need for a soak material and the size of the required construction.

Another of our design criteria was to build the smallest practical toilet so as to avoid adding another structure to the glen and so minimise the environmental impact. The bothy being built on bedrock meant that a vault constructed above ground level would end up dwarfing the bothy itself.

All that remained from our options, then, was the VIP. We weren't, however, terribly happy with this either – again, digging holes in bogs or bedrock is not easy, we didn't like the idea of another structure, nor did we like the idea of holes full of mouldering excrement.

The most significant design problem was unavoidable – people. People are used to public toilets being kept clean by paid staff. If something goes wrong and someone makes a mess, it is someone else's responsibility to clean it up. At an unstaffed bothy like Corroul, it is unfortunately all too easy to make a mess and walk away leaving the mess behind. Any sort of toilet is also likely to become a receptacle for rubbish of all sorts – biodegradable or not.

A bit of research came up with a sales brochure that suggested a possible solution to some of the difficulties : a geotextile bag. This works like a mini septic tank - the bag receives the contributions and its woven structure allows the liquid to pass through while retaining the solids. A bag could be slung below a toilet seat and detached, dried and stored whenever full, and the drainage could be run out to a small soak-away. Would this work if installed in a simple structure attached in the lee of the

bothy? We didn't know, but thought it worthwhile to trial this system over a year to see what happens and how bothy visitors react to it.

The geotextile bag idea is actually rather complicated – according to the brochure, liquidised effluent needs a flocculating agent added to it to help the solids precipitate. We wouldn't be using water, but would the bags dry out anyway? We set up a simple trial using tins of sweet corn and baked beans - standard bothy fare – and watched these de-water to a dry mass in a few days.

What we proposed, then, to the National Trust Mar Lodge Estate and the Cairngorm National Park Authority was that the MBA add a simple structure to the south of Corroul bothy which would house an experimental toilet using the geo-textile de-watering bag system. A standard pedestal seat would be mounted on a raised floor and a bag attached underneath. When full, the bag would be left to de-water, and the pedestal moved to be positioned above a second bag.

When the second bag was full, the first would be detached and stored in a secure structure and a new bag fitted. The stored bags would be left to decompose over time and when safe, either buried in an suitable location or removed from the site.

After a lot of discussion between all concerned, applying for planning permission, and negotiating over health and safety issues, this proposal was accepted. Scotland Unlimited also gave a grant to support a maintenance programme that would monitor the toilet over a year's use. The maintenance would be undertaken by MBA personnel, who would monitor the toilet, change over the bags when necessary, and take samples for analysis.

Returning to the greatest challenge – people using the bothy – we have faith that visitors will recognise the work that has been invested in improving Corroul and will take responsibility themselves for its maintenance.

All of the work, reconstruction, and negotiations to date have been done entirely on a voluntary basis through the wish for Corroul to continue as a shelter for those who love wild and lonely places. If visitors are not able to rise to the challenge of looking after what is in fact their bothy, there is a high risk that the bothy will have to be demolished and removed, as have other shelters in the Cairngorms.

We ask all who visit Corroul take special care to look after what has been provided for them. This means not only making sure that any personal mess and rubbish are cleared up and removed from the site, but also any mess left by others is also cleaned up and removed. The toilet is not designed to take anything other than human excreta and toilet paper. Men are advised to urinate outside, well away from the bothy, to keep the liquid entering the toilet to a minimum. All rubbish, tins, bottles, food of whatever kind should be removed from the bothy and in no circumstances put down the toilet.

If there are serious problems that cannot be resolved, please contact the MBA at www.mountainbothies.org.uk, or leave a message or feedback at www.compostloos.org.uk, a website dedicated to the Corroul project.