Testing the Texada "goop"—a summary

Testing of the once mysterious Texada "goop", or gravel as it is officially known, is now at a point where we have a good understanding of what it is, and what makes it such a nuisance. Tests have been performed by various people and groups on Gabriola, and by Emcon at the Ministry of Transport's request. They are as follows:

1. A simplified, but pertinent, sieve test (Randy Young). This measured the amount of silt and clay—"fines" as they are called—in the goop.

2. A petrographic assessment (Nick Doe).

3. Chemical analyses of water in potholes (Nick Doe). These tests identified both chemicals leaching from the goop and those already on the road surface. A supplementary test was made to identify the source of the abundant magnesium found.

4. An analysis of acid-extractable metals/metalloids (Residents and Ratepayers Association, Erik Anderson). Acid extraction shows what might leach from the material, helps identify minerals, and is commonly used to look for industrial contamination of soil.

5. An analysis of water-extractable elements (Islands Trust, Gisele Rudischer). This identifies what is actually being leached out by rainwater.

6. Tests performed on the material at its source on Texada, the detailed results of which MOT has not yet made public (Emcon).

The goop is a mix of gravel, clay, and some sand and silt. The clay, possibly bentonite, is estimated to be 20% by weight of the total, which, if accurate, is too high. MOT Standard Specifications for Highway Construction 202.05.01 mandates not more than 15% fines. Unfortunately, getting a consistent figure for "fines" is difficult because clay is easily washed out. Samples from the top of a stockpile left open to the rain will contain less than those from the bottom. Standards ASTM C117 and D75, which Emcon should be following, attempt to deal with this, but, in the end, the precise numbers don't matter, as clay will accumulate in depressions anyway if there is too much of it. It is also possible that the clay, particularly if it is montmorillonite, carries trace metals (adsorbed cations), and so where samples are taken will affect trace metal analyses too.

The non-clay component contains carbonate-coated granules, calcite clasts, and a smaller number of bits of common volcanic and intrusive rocks. The granules are granodiorite coated with mainly calcite, but with some magnesite or dolomite. Altogether, carbonate comprises 20% of the non-clay material.

The goop contains only traces of arsenic. Test 4 showed the arsenic content, when judged as a rock, was about five times the average for sandstone, but only half that for shale. Test 5 showed arsenic in goop-saturated water to be slightly above the Canadian standard for potable water, but this will be quickly diluted as runoff makes its way into aquifers. The

bedrock of Gabriola also contains arsenic. No other toxic materials were seen except in minute traces.

Clay and carbonates form the basis of hydraulic cement, which is what so many people object to. The material is high in aluminum, which could also be contributing to its deleterious properties. Although sodium chloride is not used for de-icing unpaved roads, calcium and possibly magnesium chloride has been used for dust control. The presence of these chemicals has been detected in pothole water, Test 3. Dust control chemicals are deliquescent or hydroscopic and so hinder or prevent the clay drying out.

Test 3 revealed that the pothole water has high in magnesium. Scales of magnesium silicate are a common industrial hot-water problem and may be what is in the coatings that are difficult to remove in car braking systems. The origin of the magnesium might be the goop itself, or from earlier applications of magnesium chloride.

In conclusion, there are sound technical explanations for almost all of the complaints being made about this material. It packs down eventually when dry, but when it rains, because of its high clay content, it becomes slippery and messy—it has a “tenacious habit” as old-school geologists would say. It facilitates corrosion on vehicles by sealing in moisture. Claims that it is toxic however have not been substantiated.

This data, in conjunction with complaints graphically recorded on the http://texadaslime.org/ website (Michael Vann), puts Gabriolans in a good position to discuss with MOT and Emcon the goopy problem. One hurdle to be overcome in these discussions will be that, because Highway Engineers are more accustomed to dealing with the physical properties of road-building material than they are with its geochemistry, the specifications Emcon are currently obliged to meet probably do not include adequate consideration of the latter.

There will be a meeting with MOT technical experts to discuss the results of all this testing shortly. Contact Erik Andersen for more information.
