The electronic waste has come to life again

The ruins of an old Van de Graaff generator were found in the physics lab. The device is traditional equipment of electrostatic experiments producing very high potentials under laboratory conditions. A large hollow metallic sphere stands on insulating pillars on a base, and an endless insulating belt, e.g. silk belt runs continuously between the base and the inside of the sphere, and the charge injected on the bottom by charged combs will be deposited on the top inside the sphere. It is known that the electric charge stays preferably on the outer surface of metals – also in this case, the deposited charge moves immediately to the outer surface of the sphere, allowing new charge carriers to be deposited. Using this machine, electrostatic influence, distribution of charge on various metal parts, and even bright and noisy electrostatic discharges, few cm long lightnings can be observed – whenever the device is operating.

Our Van de Graaff generator was not like that. The charge carrier belt was simply missing, the v-belt was broken, the pulleys were almost blocked by the hardened lubricating grease. The electric motor operated with noise and even the sphere was dented. So, the device was in a bad shape.

The first steps were easy: the cleaning of the bearings took “only” a few hours. It was, however, more difficult to get the replacement parts. Some screws and nuts were found in the drawer, but for the v-belt and the charge carrier belt, I had to rummage the plastics recycling bag…

A used hair bobble was chosen to the role of the v-belt. It was elastic and yet strong enough to drive the bottom pulley. The belt was made of a red and white checked PVC tablecloth, which was no longer very aesthetic, but it was isolating and it could be charged electrically – not ideal, but well suitable for our purpose. It was cut to the right size and glued to form a loop.

The “revitalized” Van de Graaff generator was shown in the physics class.

It was great fun, with less waste. The rest of the tablecloth is now stored and waiting for reuse new application!