

## Steam in the garden

Daan Biessels

Due to the beautiful spring weather and the unfortunate situation of having to stay home as much as possible, the train hobby naturally is a welcome pastime. Especially if you can combine the hobby with gardening and some serious civil engineering. So I decided to tell you a bit more about live steam trains for the garden, especially in British 16mm scale.

It is still narrow gauge, only a bit bigger than what the 009 Society was intended for. I once built the Bregenzerwaldbahn (in H0e) in a room in the house, but after it was dismantled, I used the proceeds to buy my first steam engine in sm45 or LGB format.

The British use a separate size for garden railways: SM32 (32 mm gauge) is comparable to 009 in terms of track gauge to scale. SM45 (LGB track, so 45 mm) is comparable to h0e, such as Liliput. The scale ratio is 16mm / foot, roughly 1:19. There are a number of major brands that build serious steam locos, such as Roundhouse, Accucraft and Regner, but also a number of small series builders. This scale is ideal for self-construction. Mamod has also ventured into the serious steam loco business and the model can compete with the Roundhouse locomotives.



*Roundhouse loco, rebuilt into an HF110C*

Roundhouse is a household name in the 16mm garden railway world. These locomotives are very good, last for decades and are easy to manage for beginners. The locos are gas-fired, often have a fire tube boiler containing the burner and the gas is always used up earlier than the water, so there is no chance of ruining the boiler. The steam pressure is set at a maximum of 3 bar. Cylinders are 1/2 inch in diameter, with slide valves, so very economical in steam use. Wheels can be moved on the axles so the locomotives can run on 32 and 45mm track.

Aster is a Japanese / Chinese brand with some nice locos for narrow gauge. Same recipe as a Roundhouse, only less robust. Regner is a German brand for live steam locomotives, but they also sell a lot of loose parts for DIY. Incidentally, you can also buy many DIY kits from Roundhouse, including cylinders, boilers and complete chassis are ready for sale. Regner is a bit more

sophisticated. The locomotives have spoke wheels and milled connecting rods but need a little more attention when operating, and the boiler must be refilled in between, otherwise it will boil dry. For that purpose there is a gauge glass on the boiler, which Roundhouse does not have.



*Regner chassis/ boiler kit with home-built cab.*

Why live steam? First of all, it's not just about driving a loco. It is a real machine that requires care and a lot of the fun is having to keep an eye on the different variables such as boiler pressure, water level and level of the grease pots. The locomotives are made of brass, copper and steel, so weigh heavily. I particularly like the brass wire wheels and the heavy-duty connecting rods with plain bearings.

A second reason is that live steam is extremely powerful. A small four-wheel loco easily pulls 6 heavy freight wagons through the sharpest (600mm) radius, something where an LGB Stainz really stops or breaks its gears. The precondition is that the track must be fairly flat, because a steam engine is an equilibrium device. Certain locomotives that work with manual controls require flat track and, if possible, not too many straights. This is meant to keep the rolling resistance over the entire track as constant as possible, so that the speed remains uniform without having to adjust.



*The existing layout has many curves to keep speed down.*

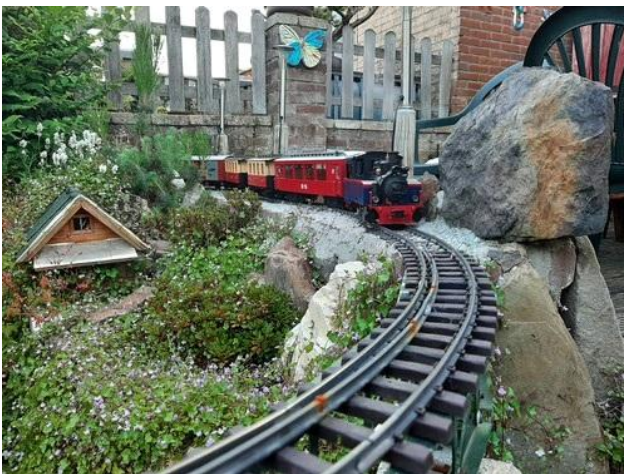
A third reason for live steam is that there are many extra features that an electric layout does not have. Think of sound, smell, smoke, temperature. If you burn your fingers on a 009 loco, it can go into the trash can, as something went very wrong .. With a steam loco everything is hot, it smells of warm oil, the puffs and hisses and blows and (especially in cold weather) a lot of exhaust steam is visible from the chimney, which creates a true railway atmosphere.



*The spectacular Alpsteinbrücke was made using aluminium section.*

Last but not least, it is not a toy train that looks like a real one. They are real locomotives, they are only smaller, but the effect is the same. Just like the real ones, they have their own temperament, are sometimes sulky, have personal quirks and require the same attention as a big one.

The track also requires more attention. After much messing around, I dug a trench with loose boards at the bottom and built a half-brick circular wall with the track on top. Soil was thrown into it and stones were added. The bridge pillars are also set in concrete to prevent them sinking. This has now been in place for a number of years without having to be repaired all the time, because if something is sagging, it is immediately noticeable and derailment with a live steamer is really "not done", because the safety valve sprays scalding hot water. Had that once, fortunately in winter, so I was in a thick jacket. But you don't want to catch a hot loco when you're in your T-shirt.

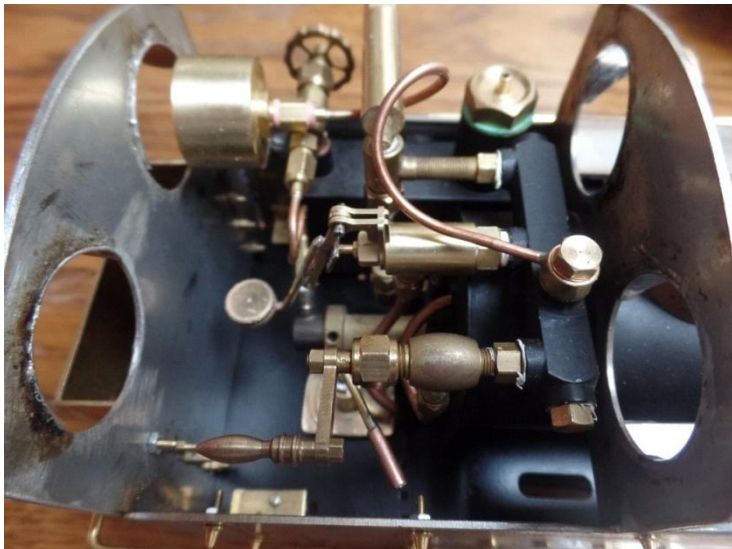


*Passenger train under way on my Dampfbahn Schwägalp.*

Locos can be operated manually or with a remote control. There is something to be said for both. I personally think that a steam loco should not have batteries and therefore should be operated with levers and hand wheels. But if you have a large garden or if you really want to shunt extensively, remote control is more practical, although you do lose part of the "steam experience".

A few notes that are not unimportant. Indoors, heating up a live steam locomotive is not advisable. It is not a spirit-fired Wilescot machine. You can get carbon monoxide poisoning if the room does not ventilate properly and the amount of steam that comes out during use is considerable. Half a litre of water is gone in the blink of an eye.

Second is that the boiler is under pressure, so testing regularly that the safety is not tight, all connections are properly tightened, etc. is important. I have once had a burst gauge glass and the amount of hot water that comes out in the form of hot steam should be seen to be believed (3 atmospheres of boiling water immediately turns into steam when a pressure drop occurs). But you can see this coming in advance, because the glass had a small crack at the top, and I thought "mwah, is still possible". Not so. So it really is an outdoor hobby (and therefore easy to combine with 009).



*A look at the works of the Regner loco.*

Next... it's quite pricey. The locomotives are often close to 1000 euros each, but retain their value as if they were made of gold. Not infrequently a used 10-year-old loco is sold for about the same amount as a new one. On the other hand, you don't need many of them to have a good time. Mamod, Roundhouse, Accucraft and Regner all have entry-level locos in their program costing around 700 euros new. Occasionally you may find a used loco for considerably less, but usually there is something wrong with it. And then you just have to find out what's wrong. This is how I got two of my locomotives, both projects that were stuck (1 literally).

Peco and Accucraft make SM32 rolling stock, you can of course just buy the SM45 from LGB. And there is a lot of scratchbuilding going on and wheel sets are bartered.

How do you fire up a live steam locomotive? In the first place, the valve gear and connecting rods are fully functional. So before every run you have to make sure that the bolts are tight, play hasn't occurred somewhere all of a sudden and that it is well lubricated. For this I use engine oil from an oil

can. Engine oil can withstand high temperatures and lubricates even when it is cold. In addition, it contains dopes to prevent wear and to absorb wear particles in the oil.

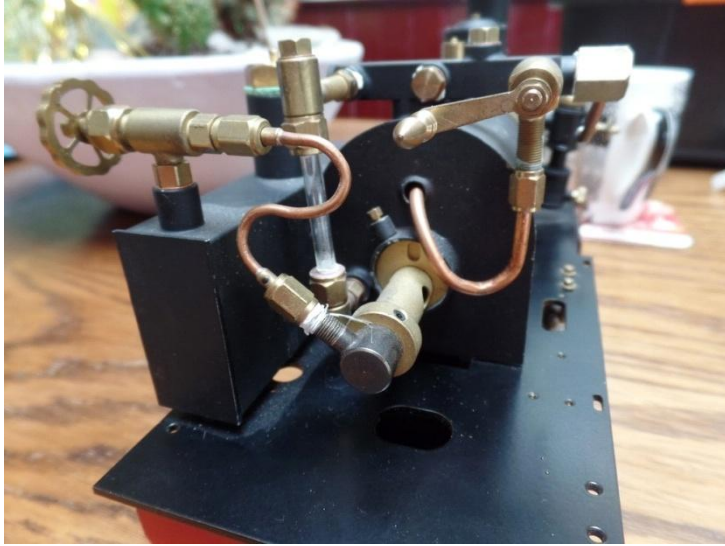
It works well for me, provided you are not too economical. The rods of a model steam locomotive should look bright and shiny.



*Milled rods of the Regner loco, there are quite a lot of moving parts that require lubrication.*

When the gear lubrication is completed, it is the turn of cylinder lubrication. Usually this is done with a "displacement lubricator", which is a grease pot through which the steam pipe runs. There is a small hole in this, through which steam escapes, condenses and because oil floats on water, the condensate gradually pushes the oil from the lubricating pot into the steam pipe. This is special steam oil that does not burn in the superheater and is very effective for smoothly running the O-rings that seal the pistons in the cylinder.

Then fill the water. With a Roundhouse locomotive, you fill the kettle to the top and then take 40ml out of it. Other locomotives have a gauge glass. The water is just another story. Normal tap water contains lime, which remains in the boiler. So do not use it. Filtered rainwater, melted ice from the freezer or condensate from an air conditioner is much more useful. I myself have soda bottles in a cupboard in the shed, which contains a supply. Each bottle has a piece of copper pipe in it, to ensure that there are enough copper ions in the water so that the locomotive boiler is not eaten up. Pure water is very corrosive, especially for copper and brass. Some locomotives have a filling valve, so you can refill them with an external pump bottle when the boiler is under pressure. Especially recommended for Regner locos, because gas tank size and boiler volume are not tuned together.



*Location of the gauge glass in the Regner loco.*

Finally the gas. There are also coal-fired locomotives in this scale (Riverdale for example) and these require just a little more of a fine touch and give an even greater steam experience in return, only building a good coal fire in such a small boiler is something you have to practice for a while and it the water level in the boiler is even more critical. So gas is what I prefer. I use gas cartridges for a weed burner, sold by a DIY chain over here. This is butane gas, propane (or a mixture) is also possible and does especially well in winter (clearing snow!). You fill the gas like you'd do with a lighter - it runs into a tank. There is a hand wheel with which you can regulate the gas pressure (the tank heats up, so you have to adjust it quite often) and thus control the burner strength and your boiler pressure.

Lighting up: With a gas stove lighter (long handle) you can light the fire via the chimney, in or under the smokebox. Turn the gas wheel open until you hear a soft hissing sound, after which you ignite the lighter in the desired place. You will hear a loud pop and a hoarse noise from the burner. The sound resembles that of Darth Vader's black space ships. In any case you know, as long as you hear that sound, the burner is on. If you hear "pop again" and then it hisses, the fire is out and only gas is running. Start slowly so that everything can warm up slowly. When your pressure gauge starts to rise, you can open the regulator to heat up the cylinders and pipes. Only after a while there is enough pressure to get the machine moving. This is first done in fits and starts with a lot of water coming from the chimney, because all steam first condenses until the machine has warmed up.



*I have two lighting-up sidings and a large suitcase for the locomotives with tools, oil, gas and filtered rainwater.*

Driving: once there is enough steam pressure, or if the safety blows off (then the pressure is at its maximum) you can move the gear lever (forward or in reverse) and turn the up the regulator. Some locomotives have to be pushed in the desired direction of travel - they do not have a lever, but a slip eccentric. Most "entry-level" locomotives have such an arrangement. I don't really like it myself, but it works fine and does not affect the performance of the locomotive. I just like a lever that you have to use instead of using the "hand of God" to push the loco. With time, the gas pressure increases, because your gas tank heats up (next to the boiler) and it contains less liquid than at the start. Water also slowly disappears from the boiler, so the evaporating surface is much larger (halfway down the boiler the cross-section is wider than at the top) and the water is hot, so it boils more easily.

So you will have to turn the gas pressure back (very little, listen to the sound) and reduce regulator a little. With a loco having a refill option, you can also reduce too high a pressure in the boiler by adding some cold water. Meanwhile, take a regular look at the gauge glass. Especially if the boiler is warm and the locomotive has to work hard, the water level will go down in no time. If your gas runs out earlier, the burner will be off and the locomotive will simply stop somewhere, but if this is not coordinated, the boiler will boil dry. This can cause the flame tube to warp or the brazing of the boiler or fittings to melt, resulting in the boiler leaking. And you don't want that. So it takes some practice and attention, but that is also part of the fun of real steam.

The locomotive is very hot after a run. You burn your fingers on everything you touch. So let it cool down. Open the regulator so that the cooling boiler can draw in air, otherwise it draws vacuum and can suck in all the mess when opening the lubricator. You don't want that either - the grease pot is now largely full of water and mud. There is a drain plug at the bottom of the tank for this. I often use the last bit of steam from the boiler to blow this out (hot draining), but you can also just loosen the filler cap, so that the residue runs out. Pay attention to all O rings and plugs so they do not disappear somewhere in the grass. When you take the loco off the rails, put it on a cloth or a paper towel and wipe it clean. The bottom is an oily mess and if you put it in the storage closet in that state, your wife

is not happy. If you do not use it for a long time, you must also empty the boiler completely by unscrewing the safety and draining the loco upside down .



*Snowplough on a Roundhouse locomotive. This has a lot of power when it is properly warm.*

Sometimes I just put the locomotive on a test rig to let it run, especially after maintenance or before it can go back on the track after the winter break. Even if you are going to clear snow, it is useful to first warm up the machine on the test rig, otherwise it is only spitting condensate. For this I built a special snowplough that can be clipped on a loco. Is also a very nice activity, but there must be snow Unfortunately last winter we hadn't any...

In all, I hope I have been able to show you something of the world of (British) garden railways, because live steam is rightly very popular in the garden. It is often combined with gardening and is therefore a joint hobby of husband and wife. Add to that the fairs and meetings and clubs, well, you know what I mean!