Laser Cut Transporter Wagon

In order to bring you something different from the buildings that have been shown in the other items on the Spring 2021 Laser Cutting page I thought I would briefly describe a project to create a wagon using laser cut plastic card. I immediately have to own up and say that this is not my project, but one undertaken by Roger Noble for our mixed gauge industrial layout. On this layout, which depicts a mixed industrial site towards the end of the Second World War, we have both standard gauge and narrow gauge systems. The narrow gauge being from an earlier system.

Roger decided it would add a lot to the operational interested if we could transport standard gauge wagons on the narrow gauge system, loading these wagons on scene. Hence the need for a narrow gauge transporter wagon.

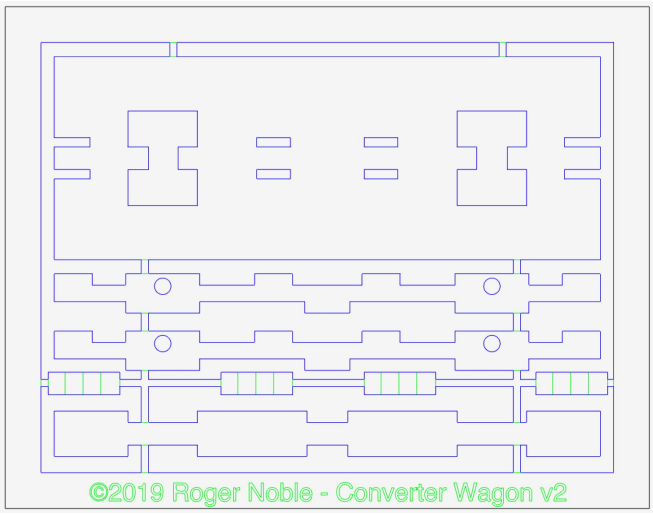
The Prototype

The prototype inspiration came from the transporter wagons operated by the Leek and Manifold Railway.

The wagon is a fairly simple shape and hence a good candidate for being constructed from plastic sheet. We would probably want more than one of these, therefore being able to produce a kit of parts that could be repeated in small number seemed reasonable.

The Design

The design for the wagon was draw using a 2D computer aided design (CAD) tool, in this case TurboCAD.

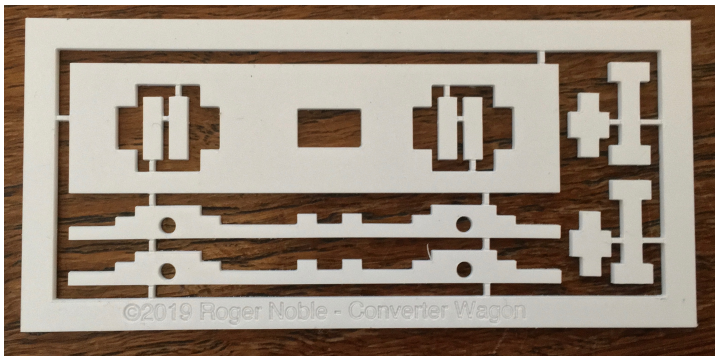


The wagon has a flat base, that forms the deck on which the rail will be added for the standard gauge wagon to run onto. Cut outs in this deck allow the narrow gauge (009) wheels sets to fit through. This allows the carrying deck to be low to the ground, giving the advantage that only a small height difference is needed between the standard gauge track and the narrow gauge in order to

load the wagon.

Two side frames are cut which will take the 009 wheel bearings, these frames have tabs that fit into slots in the deck. The raised centre deck then sits on top of these side frames, again with a slot and tab fitting. The centre deck height being enough to clear the tops of the 009 wheel sets.

Cutting



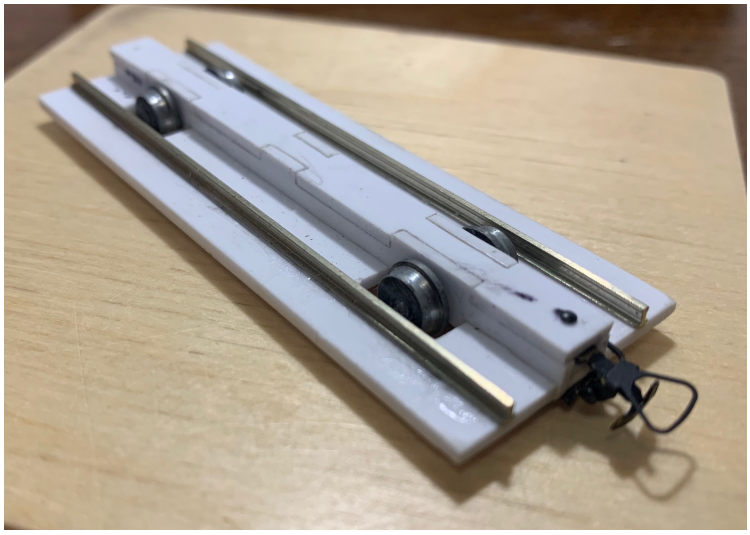
The wagon "fret" was then cut from 1.6mm laser compatible plastic card to create the basic set of components required to form the wagon.

The fret shown here is actually for the earlier, mark 1 design that provided for a flat floor. It quickly became clear that by combining the under frame with the "hump" on the top overall construction was more straightforward whilst providing space for some useful weight.

You will note that the drawing and the fret have been produced with small sprue that prevent the components becoming detached from the surrounding plastic. This has two advantages, it keeps the parts together and it also prevents the smaller parts falling through the gaps between the bars that make up the bed of the laser cutter which was used.

The Model

The model virtually clips itself together, such is the fit that can be achieved by laser cutting. It is however assembled using plastic solvent with the wheels trapped in the sides.



Sections of code 75 rail are then glued to the deck, at the appropriate gauge for the OO wagons to run on.

The ends of the raised centre section provide pockets into which 009 couplings have been inserted.

The extra weight added in the centre box area between the two 009 wheel sets aids the running qualities when there is no standard gauge wagon loaded onto the transporter wagon.

Most wagons of this type had the narrow gauge wheels should be inside the "hump" but there just isn't clearance in OO. But P4 or EM might have more opportunities in this respect.

Conclusion

Although very simple in construction, more detail can be added, the laser cutter provides a good way of being able to produce a run of these little wagons that are consistent, robust and run well enough. A few problems still remain to be solved; for example when loading the standard gauge wagon we need to make sure the narrow gauge locomotive is coupled in place to stop the transport wagon rolling away.

Also, if the narrow gauge train jerks even the slightest amount we can find the standard gauge wagon rolls off the transporter wagon, leaving an embarrassing derailment that is somewhat out of gauge. We have plans for various braking systems to prevent this from happening.

This project has certainly made us both think about the possibilities of laser cutting other items of rolling stock. If not complete wagons, coaches or locomotives, at least component parts of them. The laser cutter certainly opens up the possibly to create our own kits, this is obviously nothing that could not be done by somebody with some Slaters plastic card and very good skills with a scalpel. However it would be hard to create the consistency between multiple wagons.

My thanks to Roger Noble for permitting me to reproduce his project here and for also suppling the pictures. Also the Princes Risborough model railway club for the use of the laser cutter.