

Information Bulletin MiniatuurA

How to work with magnetic wire

Preface

Magnetic wire is a flexible magnetic material that replaces the standard Faller wire. It is 3mm wide, 1mm thick and comes in a 3x1 meter package. This magnetic wire offers a number of advantages compared to the standard wire. This way you can adjust the tug, at the front axle of the cars, to make it a floating tug. You then enjoy, next to a better vehicle guidance, the following benefits:

1. There is no wear on the tug
2. No third wear track on the road surface
3. Less resistance for the vehicles and therefore
4. Less wear and stress on the drive and motor
5. Longer driving times with a battery charge



The latter is especially important for small cars that have a small battery capacity and therefore be empty correspondingly quickly. Before working with magnetic tape, a number of things must be taken into account. In this information bulletin we propose a number of solutions so that you can work with you successfully.

Properties

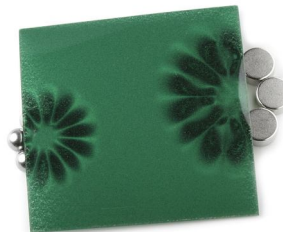
To begin with, the magnetic wire has a top and a bottom. It is flexible and therefore it can easily be bend in curves. It should be layed in such a way that the tug magnet is attracted by the wire. The bottom will repel the magnet. However, be careful if the magnetic tape is layed upside down, it can still seem that the vehicles are properly guided. This is because the tug magnet is then guided over the side of the magnetic wire. During installation, check regularly whether the right side is up !!

Tools

Which tools do you need to properly move magnetic tape? It's not difficult to properly lay magnetic wire, you can usually work with the standard tools. These are sharp scissors or a scalpel, a hand or motor drill, set of drills, putty knife, etc. However, there are a few tools that are not standard but very easy to have on hand. These are for example:

The magnetic field detector:

With the magnetic field detector you can see where the magnetic wire is when the road is finished, it is very handy to check the right settings of the turnout servo.



Forstner drills:

When you work with Streetsystem's turnout or stop servos.

The 3.1mm cutter if you want to mill grooves yourself.



Or the 8x5mm Neodium magnets to remagnetize the magnetic wire.

The floating tug

By adjusting the tug as shown in fig.1, it will rise above the road surface, as it were "floating". For this you need to tighten the screw so far that the tug is just released to move. The vertical play should be as small as possible. Then you will adjust the tug by changing the angles shown in the drawing. This is easier when you hold one part with fine but firm tweezers and hold the other part with another tweezer and make the bend. It is a good idea to keep the space between the top of the road and the bottom of the tug as small as possible. This maximizes the guideness and minimize the chance of "derailment".

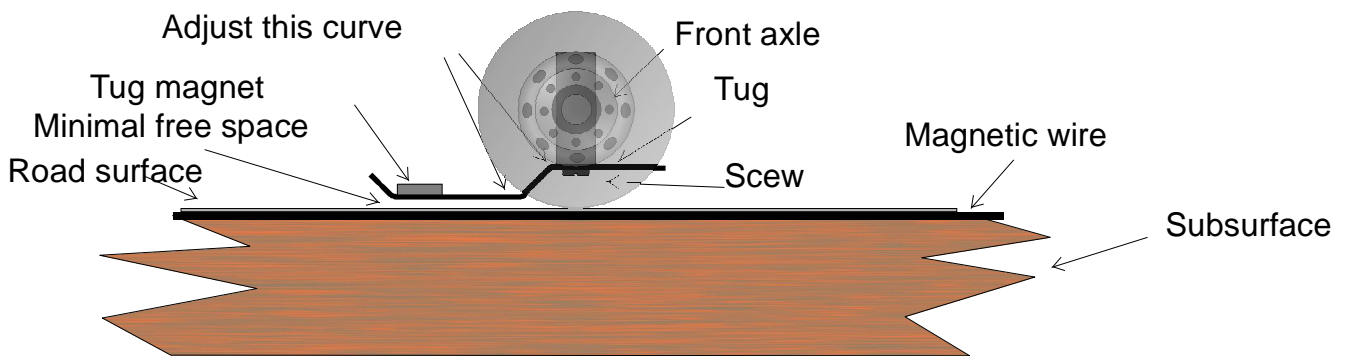
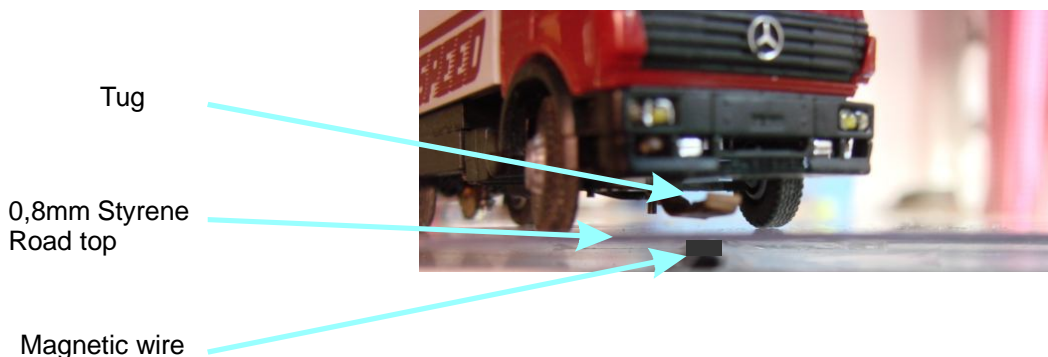


Figure 1.

The tug is set very high on the car in the photo below. Nevertheless this tug follows the magnetic tape without any problems.

Conditions for proper functioning are that the steering mechanism and the bearings of the wheels are clean. Dirty wheel axles and therefore heavy rotating wheels are often the cause of the loss of the contact with Faller wire annex magnetic tape. Especially hair and dust are attracted, by the narrow space between wheel and suspension. If this gets too bad, the wheels can even lock, causing the steering system to bendis forced.



How to work with magnetic wire?

The magnetic tape can be laid in different ways. We distinguish 3 method.

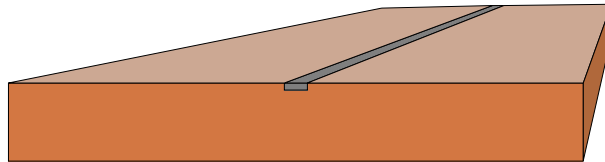
1. *Magnetic wire in the carrier plate*

In this case, a groove is milled in the carrier surface with a top milling cutter. The slot must be 3.1 mm wide, the magnetic wire fits nicely here, the depth is 1 mm. We have for this a special milling cutter in our webshop. Freehand milling is not very easy, and a tight result requires a very steady hand or good guidance. For curves mostly molds have to be made.

Advantages of milled magnetic wire is that the surface has little finish needs. The top must be smooth and flat and can, you possibly need filling and sanding after milling. The surface can be finished with street / asphalt foil or paint for a quick result.

The disadvantage is that any corrections cannot be made easily.

Good dust extraction is desirable during milling because it produces a lot of dust!



2. *Magnetic wire on the carrier plate*

This method is especially recommended for testing the geometry. The lanes are drawn on the carrier plate. After this, the magnetic wire can be laid and with (painter's) tape be fixed. When that is done, a thin road surface has to be covered, this can be thin cardboard. Then it's time to go for a test drive. Do the cars drive well and are the distances enough in the curves, the spaces in between can be filled with 1mm thick cardboard, plastic sheet or filler. After this, the road surface can be finished with street / asphalt foil or paint.

The advantages are that it is easy to work with and produces results fairly quickly. Especially when trying it out, this method is flexible for curves with oncoming traffic.

The disadvantage may be that the height difference caused by the 1 mm height of the magnetic wire, must be filled. This can be done with 1mm thick cardboard, styrene, plaster or putty.

3. *Working with the Streetsystem elements*

It can be even easier and faster with the elements of Streetsystem. This system consists of over 100 different parts. The track elements are made of 3mm thick MDF in which a slot for the magnetic wire has already been milled out. Elements of the track are connected with special connector elements, it looks a lot like a jigsaw puzzle. The system is available in three widths: 52mm, 44mm and 30mm. Templates are available via the MiniatuurA website download area that allows you to print 1:1 and see without too much cost which elements you need to realize your road network.

When printing the templates, make sure that the scale is at 100%!

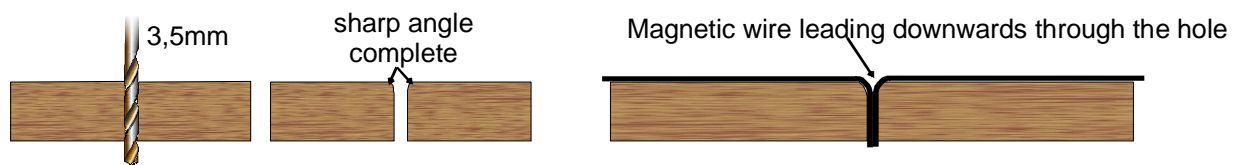
Joining magnetic wire

Magnetic wire is supplied in lengths of 1 meter. This means that welds have to be made. You would assume that you could put the magnetic wire together. However, this is not the most ideal method. If you do this, you run the risk that magnetic stray fields are created at the joint, these ensure that the tugs will be raised when passing and come down again a little further. This can be heard as a soft tapping sound and is of course not really desirable. It is therefore better to drill a 3.5mm hole on the spot of the joint from there the magnetic wire is lead downwards.

The next piece of magnetic tape is then also fed into the hole and moved further.

This creates a smooth magnetic field that gives the tugs an optimal guidance.

It is recommended to round off the angle of the hole so that the magnetic wire makes a smooth bend downwards. This can be done with a sharp hobby knife. This prevents the magnetic tape, on the corner, from breaking, which is of course undesirable. In the figure below, in cross-section, indicated what it should look like.



Insurting magnetic wire

In places where the magnetic wire come together, the same can be done as above described. However, it is also possible to let the magnetic wire run underneath each other. However, a difficulty is always that the tug moves from one magnetic wire to the other at a given position. This jump will give a little wobble in the steering.

Reverse Magnetism

It may happen that the polarity of the magnetism is reversed. This is usually caused by metal (iron) or magnetic objects laying on the magnetic wire.

This seems, at first, a big problem, but it is not that bad and is relatively easy to remedy.

Take a strong (Neodium) magnet and slide it, with the correct pooling of course, a number of times over the magnetic wire.

This way you are able to restore the original magnetism. Through the moving cars with their tug magnets, the magnetic wire is in fact magnetized every time.

Fixing magnetic wire

If you want to glue magnetic tape, it is best to do so with a type of glue that does not solvents, such as the well-known wood glue, super glue can also be used.

Turnouts

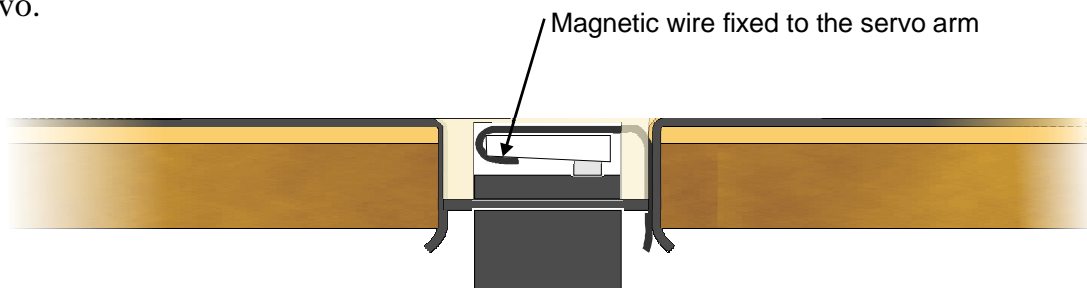
We naturally want our vehicles to take turn outs. There are a number of options for this. In the section Joining magnetic wire, we explained why the magnetic wire must be taken downwards to make a joint. This principle is also found at the turnout servos from StreetSystem. Magnetic wire is used for this, which is bend by a servo to divert a vehicle into a different lane.



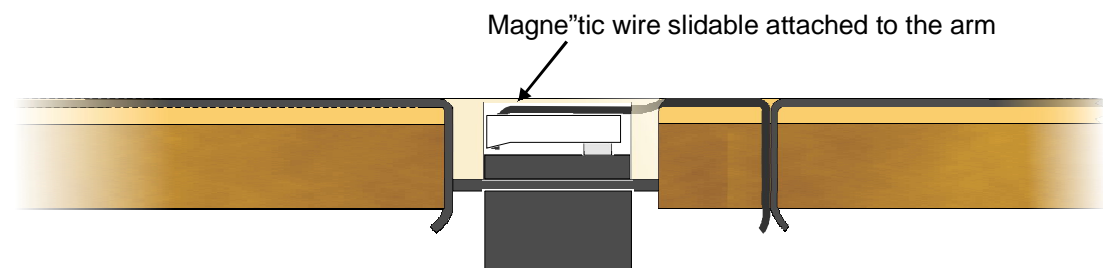
Installing these turnout servos is relatively easy. When you use the Streetsystem elements: in a number of cases the holes for have already been pre-milled.

At the position of the servo, only the carrier plate still needs to be pierced with a 30mm frostner or butterfly drill. If you do not use Streetsystem elements, you must first drill with a 32mm frostner drill about 1mm deep, after which continue with the 30mm drill being pierced. The 32mm x 1mm is for countersinking the collar of the turnout servo so that it is flush with the top of the street.

With Streetsystem servos up to version V4, the magnetic wire of the servo is bend directly after the servo downwards. With these versions, the magnetic tape is attached fixed to the arm of the servo.



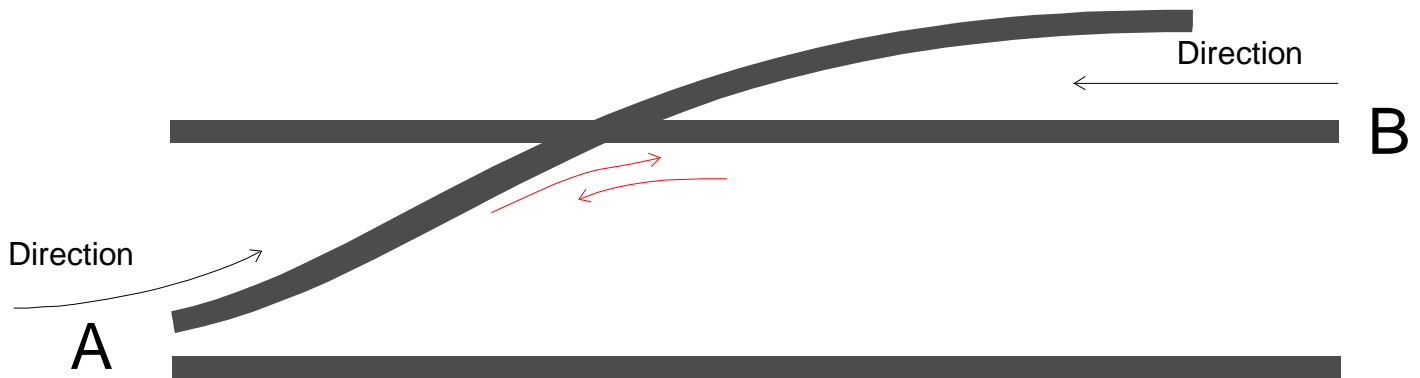
With Streetsystem servos from V5, the magnetic wire is slidably attached to the arm. From this version, the end of the magnetic tape can simply be inserted into the milling slot shifted and moved down there as expained in “Joining magnetic wire.



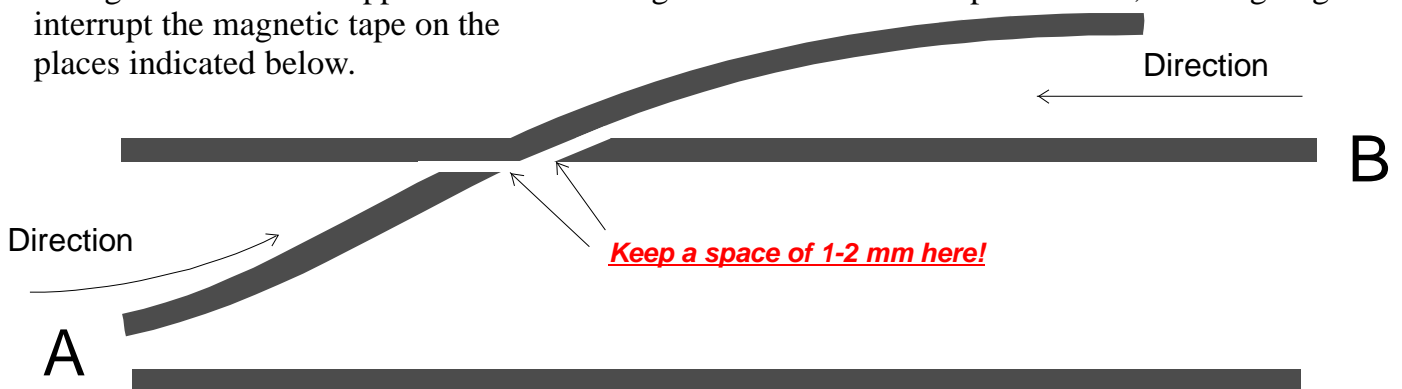
The Streetsystem turnout servos have a diameter of 32mm. This means that the angle of deflection is quite sharp. This way of deflection is well usable for most applications, however, there may be times when you want a shallower deflection angle. In those cases you have to rely on self-building.

Crossings

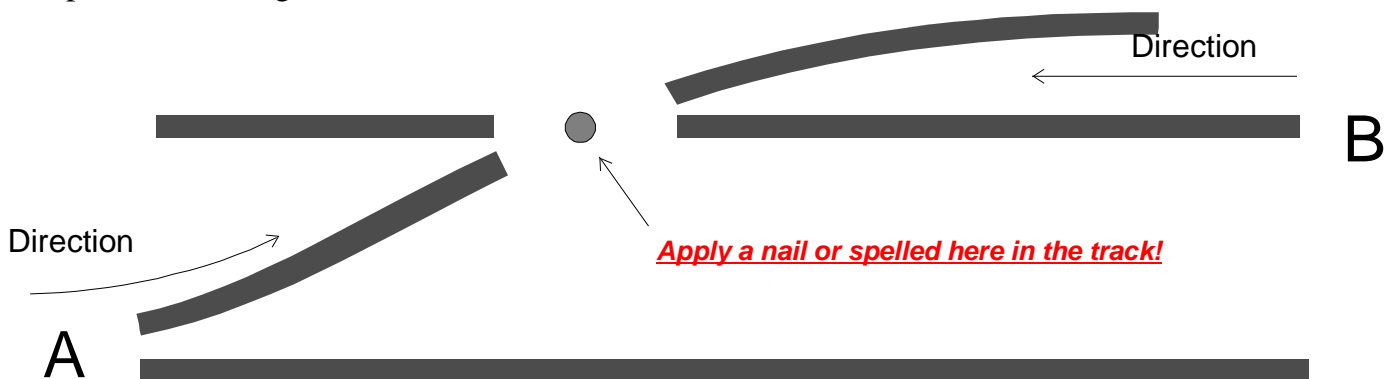
A problem with both metal wire and magnetic wire is making crossings. When the intersection angle is too small, the tug can choose the wrong lane with all the consequences that entails. It is therefore important to with magnetic wire as metal wire to ensure an unambiguous roadway where the tug gets as little chance as possible to take an unwanted route. This problem is greater for magnetic wire than for metal wire, but with a little knowledge and some experimentation we will come a long way to master this problem too. For the sake of convenience, we assume a roadway that is a fork in the oncoming lane crosses. The drawing below shows what can go wrong.



A car from A can pick up the magnetic tape towards B at the intersection and thus choose the wrong lane. The same applies to a car coming from direction B. To prevent this, we are going to interrupt the magnetic tape on the places indicated below.



This is difficult to implement in practice, and the tug will also move from driving direction B when passing the intersection be pulled to the right by the outer magnetic tape. The car really won't leave the track, but it will make a small swing. In practice it will give the best results below.



Note: All magnetic tape ends must of course be let downwards!!

Questions and answers

A. Vehicles losing track:

Cause:

Front wheel axles soiled: A wheel runs heavily, forcing the front axle to deflect.

Solution:

Clean axles and tires.

Cause:

Tug magnet soiled: The tug magnets pick up dirt on the way and of course especially iron filings. The latter in particular causes a magnetic short circuit with the result that the vehicle will no longer follow the magnetic tape.

Solution:

Clean the tug magnet. This is easiest with Blu Tack. This is a kind of kneading eraser, take a small ball of Blu Tack and press the tug magnet in it. Pull the Blu Tack from the tug, you will be surprised at the amount of dirt that comes off.

Cause:

Tug magnet no longer present, the tug magnet is glued to the tug shoe. It is not uncommon for the magnet to come loose and route get lost. It will often turn out later that a another vehicle has picked up the magnet. This usually causes a steering problem with this vehicle.

Solution:

Replace tug. When you have been able to find the old magnet, you can try to glue it back onto the tug shoe (pay attention to the polarity!). However, usually the magnet is damaged due to the bonding and it is better to install a new tug.

Cause:

Polarity of the magnetic wire is reversed: Due to ferrous or magnetic objects leaving it on the magnetic tape can reverse the polarity.

Solution:

Go over the magnetic wire several times with a strong neodium magnet (eg our 8x5 mm). Make sure that you hold the magnet with the correct polarity towards the magnetic wire. This is easy to check with the tug of a vehicle, this must attrac the magnet with the right poll.

Cause:

Magnetic wire is placed the wrong way round: Always check beforehand whether you have the correct polarity on top. Incorrectly placed magnetic wire can initially make a vehicle appear to guide. However, on closer inspection, the vehicle does not appear to pass through the center of the magnetic wire but be guided via the side (only 1,5 mm difference...), this can be cause problems later.

Solution:

Remove the magnetic tape and re-insert it with the correct polarity at the top.

B. No vehicle guidance

Cause:

Tug magnet no longer present, the tug magnet is glued to the tug shoe. It is not uncommon for the magnet to come loose and the route to get lost. It will often turn out later that a another vehicle has picked up the magnet. This usually causes a steering problem with this vehicle.

Solution:

Replace the tug. When you have been able to find the old magnet, you can try glue it back onto the tug shoe (pay attention to the polarity!). However, usually the magnet is damaged due to the bonding and it is better to install a new tug.