Etched chairs for bullhead track

Laurie Adams explains how to use a new product he has designed for Shop 1.
Photographs by Andrew Hyatt.

Introduction

For those of us who prefer to include soldered construction in our track-making, matching the bullhead Easitrac plain track sleeper base (moulded in ABS "plastic") creates a problem. Well, two problems: firstly the 0.25mm/0.010'' that the ABS sleepers and chairs raise the rail off the sleepers, and secondly, matching their appearance. We have 3 current options: 1) the Easitrac sprue of cast brass chairs – quickest and best-looking but prohibitively expensive for more than the occasional chair; 2) the Versaline system with etched chairplates and cosmetic chair castings – good-looking in the right hands but a tricky 3-stage procedure which also uses glue; or 3) Bob Jones' (Fencehouses Model Foundry) etched chairplates which have a stud on each side to mimic the chair-claws.

A concern I have with the cast brass chairs is that I feel they lift the rail slightly more than the ABS chairs; they can be a tight fit on the rail and splay concavely as they are threaded on, and they have a fine moulding line around their middle. This is not a problem if the whole piece of track is made with them – they look superb and are very secure (and would easily be my preference if I could afford them), but I do try not to mix them with the ABS chairs. The Versaline and Fencehouses systems use jigs to solder their etched chairs onto sleepers first and then to solder on the rail to make a small range of standard-sized simple turnouts;

for other configurations, their components can be used free-style.

About the chairs

The recently-introduced etched chairs fill a gap left by the late Bill Blackburn's etched chairs and unashamedly draw on his design, with the claw(s) of the chairs bent up from a flat etch. An advantage is that they are single thickness 0.25mm/0.010" nickel silver and thus do not need to be made up from 2 thinner parts. This comes at the expense of a plain chair with a fractionally short inside claw, but I do not think you can see this.

There are three types of these etched chairs – slide (1-145), check (1-146) and plain (1-147) (Fig. 1), complementing the three types of ABS and cast brass chairs of the Easitrac system proper. At 50 (slide and check) and 70 (plain) chairs per fret they are a very cheap option for making soldered, chaired pointwork, but less slick and slower. Soldered to PCB sleepers, they are fully compatible with Easitrac, raising the rail by the same height above the sleeper (0.25mm/0.010"), and matching Easitrac chairs in appearance.

They can be used throughout a pointwork formation or every few sleepers, but are also useful for inserting soldered single or short runs of copper-clad (PCB) sleepers into chaired ABS Easitrac, to "repair" broken chairs/sleepers in completed track (ABS or soldered), or to recover a construction after you have broken (or forgotten to thread on the right number of) ABS chairs and it is too far advanced to face undoing it all and starting again. I use them for all the slide chairs (where they definitely make for a stronger point toe than ABS/adhesive – essential for the idiosyncratic design of tiebar that I use), for the 6 sleepers or so at the crossing ('cos I still like to solder up the crossing rail-by-rail), and also either side of the insulating cuts in the closure rails, to anchor the heel of the switch rail and stop rail-creep.

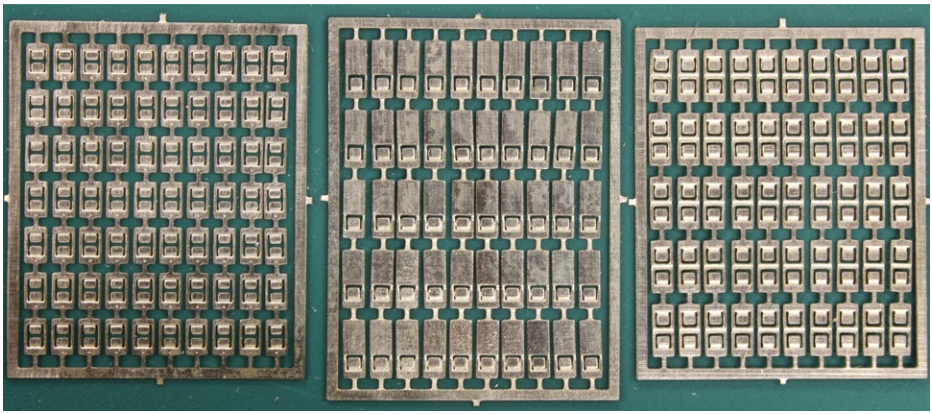


Figure 1. *The three frets of etched chairs, left - plain, centre - slide, right - check. This is the underside of the chairs which is soldered onto the sleepers. The upper surfaces are smooth, with no half-etching. Both slide and check chairs have a half-etched cut line so they can easily be made "one-sided" where there is only room for a chair on one side of the rail. After Andrew took the photographs, I realised that the slide chairs illustrated are of the penultimate design: in the final version now in Shop 1, this cut line has been moved towards the solid sliding part of the chair to avoid over-thinning the 2 "straps" that link the inner and outer sides of the chair under the rail.*

The etched chairs have a top and bottom surface; the half-etched fold line at the base of the jaw is underneath (i.e. sleeper-side) in all three types. The slide and checkrail chairs have an additional half-etched cut-off line (also on the underside) in line with the inner face of the rail so that they can be used one-sided in formations where there is no room for an inner jaw (e.g. at the crossing nose and knuckle). The check chairs are symmetrical with two identical jaws. The plain chairs are not symmetrical: the outer jaw is identified by a half-etched dot on the lower surface, and there is a half-etched rebate at the end of the inner jaw which helps to position it correctly under the rail (Fig. 2).

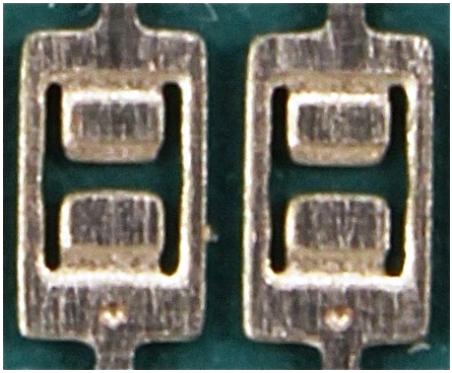


Figure 2. *A closer view of the underside of the plain chairs. The dot indicates the outer side, and there is a half-etched rebate at the tip of the inner claw which aids its location against the foot of bullhead rail.*

In Use

The fiddle factor that comes with the etched chairs is that they are a loose fit under the rail, so you potentially have two moveable parts to solder up (chair and rail). Thus ideally you need three of your hands for this job – all four of them if the sleeper breaks free and gets the wanderlust too. But there are ways to get round this, the most important of which are that the sleepers have been fixed to the track template (or to the trackbed if you are building directly onto it), and the rail is held in position reasonably closely on both sides of the sleeper/chair you are soldering.

The rail may already be fixed by adjacent chairs, but if not, a "temporary" PCB sleeper with a piece of 0.25mm brass shim (scrap etch) can be interposed between the "proper" sleepers, and the rail accurately aligned to the template and soldered to that; the temporary sleeper is unsoldered and discarded when all soldering is finished. Alternatively – and this is good practice anyway when building Easitrac pointwork – extend the template and glue down a sprue of the moulded plain Easitrac sleeper base at each entry and exit track: this helps position, gauge and align the rails through the whole formation and is well worth doing even if these sections are cut off and sacrificed in the end. (Just remember to thread all the moulded ABS/cast brass chairs onto the rails before threading them onto the plain Easitrac sleeper leads at each end.) Or the rail could be held vertically in position by the Jones double-pin (as in the "Track" book) or a vertical slot sawn into a small block of brass.

Even so, there may be quite an unfixed length of rail especially when soldering the first one or two chairs, and here it is not worth wasting too much time trying to solder the chair too precisely: solder the rail exactly into position, but just get the chair roughly in place under it. You can come back to this chair later when the rail is firmly held by the chairs (now) fixed closer on either side: much easier to get everything correctly in place as the chair is now the only moveable part and needs just the two hands.

There are different ways to prepare, insert and solder the chairs, but the following works best for me. I have stopped tinning any track parts

before soldering them – I prefer to clean them with the glass fibre brush and wipe off the grease with isopropyl alcohol or butanone. I do flux them well when assembling the components so the solder flashes right through the joint for sure, and press down on the rail with a prodder so that all sleeper-chair-rail joints are as close to the same thickness as I can make them. This all aids the attainment of a smooth, flat railhead.

Getting the chairs under the rail is the same for all three types. First, with the chairs still tabbed together in a strip, push up the tab which will form the outer claw, enough to be able to catch hold of it with fine forceps. The easiest way to do this is to place the chair upside-down over a hole 1.3-1.5mm diameter drilled in a smooth, hard surface (e.g. tufnol, hardwood, scrap etch or even plasticard), and push through with a pointed object (Fig. 3). I first used a thickish needle in the round hole, but the chair is deformed less if the prodder is "squared off": it can be the tip of a straight-pointed (no.11) scalpel blade, or can be made for the job by grinding or filing the tip of a round (or square) rod flat on opposite sides to form a thin triangle (Figs. 4 & 5). It helps if the hole is filed square too. A 1.0mm-wide slot cut in a hard surface with a razor or slitting saw would support the chairs even better when pushing through.

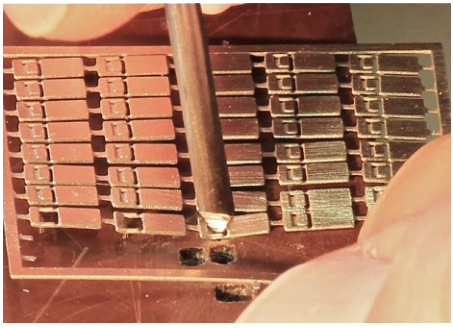
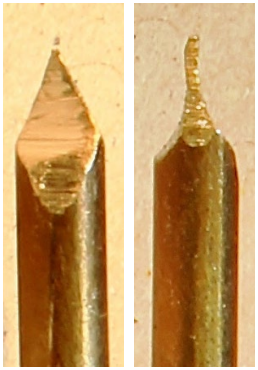


Figure 3. *Pushing up (down) the claw: the chair is upside-down, and the claw is pushed down into a 1.5mm hole in a work-block with a "pusher" (Fig. 4).*



Figures 4 & 5. *The pusher, which deforms the chairs less if it is filed or ground to a flattened triangular shape like this, rather than round. Filing the hole into more of a square also helps.*

The next step is to grab hold of the tab/jaw with fine forceps and bend it up to a full 90°. Pushing the forceps downwards as you do this helps to flatten the bow that often occurs as the tab is first pushed through (but don't worry about it now as this easily corrects when the chair is positioned under the rail). The chairs can now be separated by cutting the tabs flush with a sharp scalpel. The chair may also deform into a parallelogram: gently squeezing it between the jaws of flat-nosed forceps corrects this (Fig. 6).

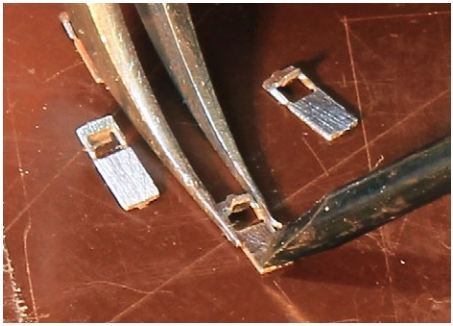


Figure 6. *Some chairs will inevitably flex and skew when the claws are pushed through, but this can be corrected by squeezing between curved or angled tweezers whilst holding down with a small screwdriver or other favoured prodder.*

With the rail hovering over the sleeper, the chair is grasped by its claw and slid under (Fig. 7); pushing the rail down with your prodder flattens the chair. A further press down over the fold line of the tab/jaw and on the other side of the chair with a blade or fine screwdriver ensures the chair is completely flat (Fig. 8). Now the technique varies for slide, plain and checkrail chairs.

Simplest are the sliders, which just have to be manipulated into position (Fig. 9) and trapped there by pressing down on the rail, then touching the chair with the iron to solder rail-to-chair-to-sleeper (Fig. 10). The claw is bent in towards the rail to match the adjacent chairs (Fig. 11). You can leave it at that – when painted, all will look uniform – or you could add another blob of solder or solder paint to fill the gap between the rail and chair to make the whole joint more solid and secure. (The risk is that you add too much and mess it all up.)

For the checkrail chairs, the inner jaw (against the inside of the checkrail) needs to be raised up 90° by levering against the rail with the tip of a no. 11 scalpel blade (Fig. 12). Another press down on the fold line of the inside tab flattens this side too; the chair is pushed into line and soldered whilst pressing down on the rail head to hold it all in place as with the slide chairs. When all the checkrail chairs have been fixed (Fig. 13) the checkrail itself can be put in, positioned against the stock rail with the gauges (roller, and strips of 0.5mm thick non-melting something-or-other – Fig. 14), and pressed down onto the chairs and soldered up (Fig. 15). Finally, the inner claws are bent back in towards the check rail to match the other chairs.

Figure 7. *A slide chair is held by its claw and slid between rail and sleeper from the side...*

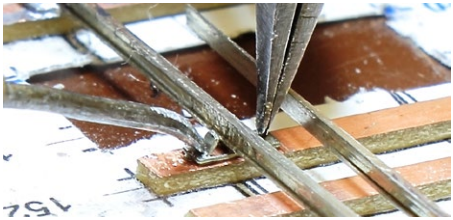


Figure 8. *...and pushed down flat onto the sleeper.*

Figure 9. *The slide chair is manipulated into position – centred on the sleeper and square-on to the rail....*

Figure 10. *...trapped in position by pressing down on the rail and soldered...*

Figure 11. *...and the claw pushed in to match the adjacent chairs.*

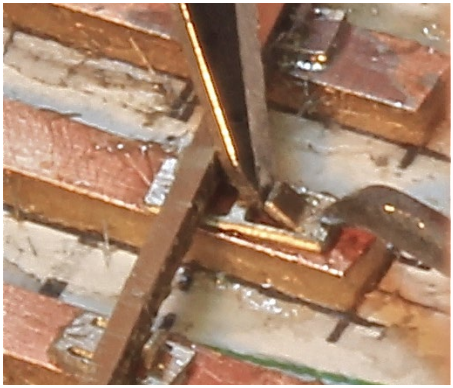


Figure 12. *After being inserted in the same way, the second claw of a check chair is raised up by the tip of a sharp, pointed scalpel (Swan-Morton No. 11) levering against the rail. For some perverse reason, this chair has been inserted from the inside here and it is the outer claw which is being levered up (the check chairs are symmetrical so this choice is yours).*

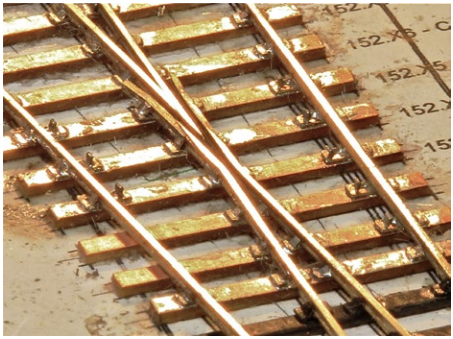


Figure 13. *The five chairs soldered in position for the checkrail on the far side, and three of the chairs on the near side. (Most of the other chairs have also been soldered into position for this crossing.)*

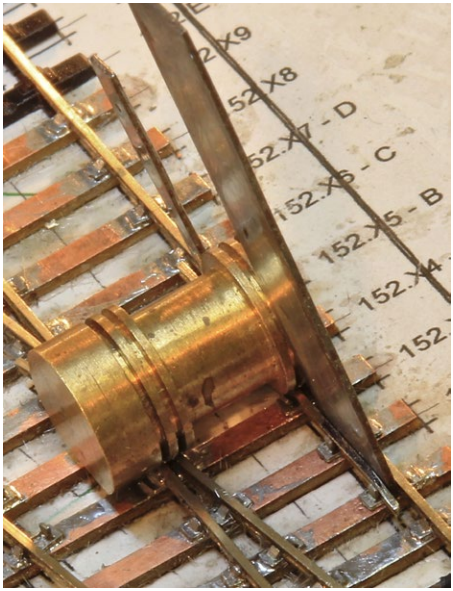
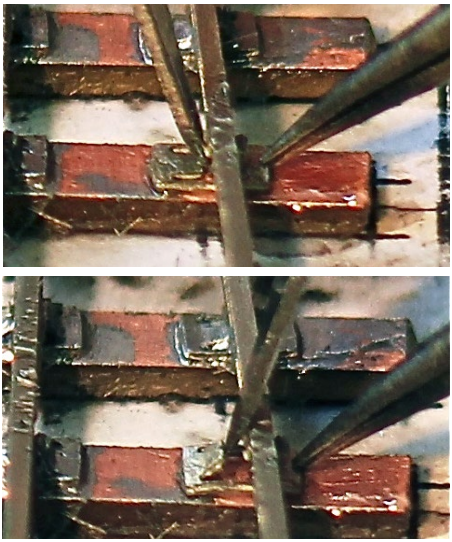


Figure 14. *The check rail is in position, its bottom fluxed ready to be soldered, held to gauge by a roller gauge in the middle and flange gauges (0.5mm thick pieces of shim) at each end.*

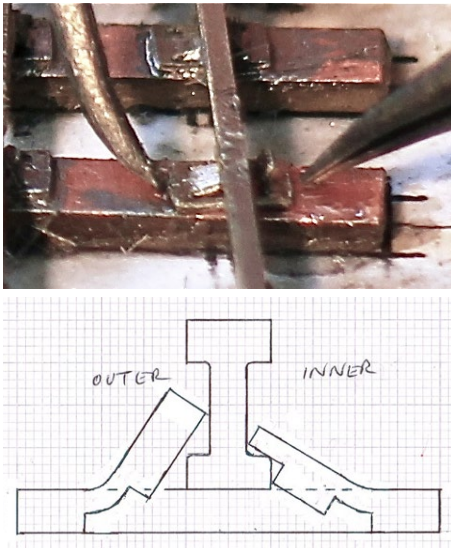
Figure 15. *Pushing down obliquely onto the check rail with your prodder (e.g. the small jeweller's screwdriver used here) traps it against the gauges and stock rail and presses it down onto the chair whilst it is soldered.*

The plain chairs are managed like the checkrail chairs, except that there is only just enough clearance to get the blade tip between the rail foot and inner claw/tab, and then only if the outer claw is raised up the full 90° and pushed up against the outside of the rail (Figs. 16 & 17). With the inner claw now also raised up 90°, the chair is manipulated back into position and the inner claw squeezed down until the rebate locates on the foot of the (bullhead) rail (Figs. 18 & 19). Press down, solder up, push the outer claw down into line – you know the drill now.

If building points with a mix of ABS chairs and soldered chairs, complete all the soldering first; as long as the ABS chairs are slid at least a sleeper away from the iron, they are unlikely to come to grief. Then, when all the soldered chairs are done, check the geometry: rail alignment, gauge, fit of switch rails against stock rails, flangeways and check gauge. Then clean, adjust and fettle as necessary, before welding the ABS chairs to their sleepers with butanone.



Figures 16 & 17. *Levering up the inner claw of a plain chair. There is just space to get the scalpel-tip in for the plain chairs, but the outer claw has to be bent up to a full 90° and pushed up against the outer edge of the rail to do so.*



Figures 18 & 19. *The inner claw of the plain chair has been eased down to locate its rebate onto the foot of the rail and positioned, as shown diagrammatically.*

Figures 20 and 21 show the etched chairs used in a soldered point crossing, and Figure 22 compares to the Easitrac cast brass sleeper base (1-179). Figures 23 and 24 compare their appearance to their ABS counterparts. The chairs extend the Easitrac family of components and hopefully also the flexibility and potential of the Easitrac system, and provide a further option for us Sauropod solderers.

Acknowledgements

Thank you to Bob Jones, for drawing up the artwork and working through a number of trial etches, and for his expertise and guidance through the whole process.

A big thank you also to Andrew Hyatt, who once again has provided excellent photographs.

Figure 20. *A soldered crossing. Two plain chairs are holding the stock rail and closure rail at the top of the picture. A check chair has been fixed under its stock rail opposite the crossing nose. A check chair is also being used at the knuckle, and where there is no room for an inner claw at the end of the wing rail either a slide or check chair has been made one-sided by trimming at its half-etched cut line. The crossing nose is "chaired" by a sliver of 0.25mm/0.010" shim (scrap etch) on each sleeper. This also nicely demonstrates how the head of the wing rail has been filed down (0.1-0.2mm) at an angle so that metal blacking (or painting) will not be rubbed off when the track is cleaned, and only the true running surfaces of the rail head will stay shiny. Fabrication of the jig to achieve this is described in the Association's book "Track".*

Figure 21. *One side of the finished crossing shown in Figure 17, using check and plain chairs. Either side of the check chair used at the knuckle, check chairs have been halved along their half-etched cut lines to make the one-sided chairs needed here. The etched chairs stand up well against the moulded ABS Easitrac sleepers of the plain track on the right. The flangeway below the check rail looks too narrow (it isn't) because it has been filed down 0.1-0.2mm like the wing rail so that chemical blackening won't be rubbed off here either when the track is cleaned.*

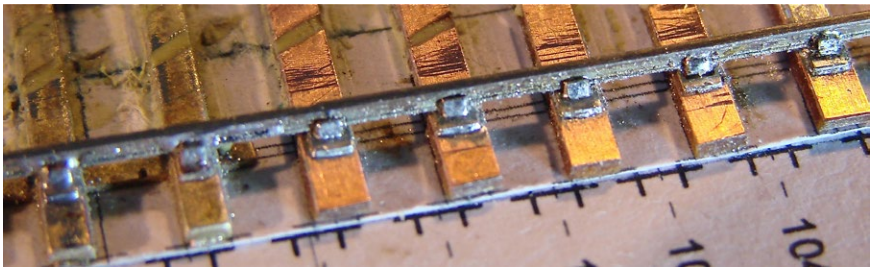
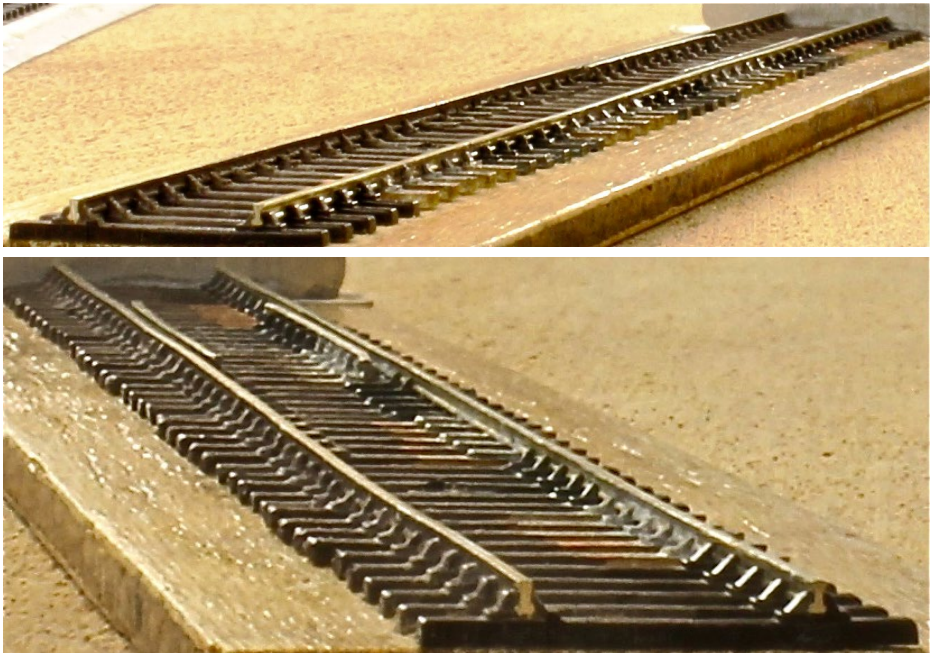


Figure 22. *Comparison of plain etched chairs soldered onto pcb sleeper strip (1-180, the 5 sleepers on the right), and the Easitrac cast brass sleeper base (1-179, the 2 chairs on the left). The pcb sleeper strip is to scale for 1' wide crossing timbers, wider than the standard (9") sleepers of the brass plain track.*



Figures 23 & 24. *A piece of chaired bullhead track built to compare moulded ABS chairs from the sprue (I-181) welded to ABS sleeper strip (I-180) and the etched chairs soldered to pcb sleeper strip (I-025). The same technique has been used on both rails for the same 5-sleeper sections, brush-painted ("Humbrol Track Colour") along one rail and left unpainted on the other. Figure 23 is from the unpainted side; Figure 24 is from the painted side.*

From front to back in both views they are: moulded ABS sleeper-base for plain track; plain etched chairs soldered to PCB sleeper strip; plain ABS chairs welded to ABS sleeper strip; slide etched chairs soldered to PCB sleeper strip; slide ABS chairs welded to ABS sleeper strip; check etched chairs soldered to PCB sleeper strip; check ABS chairs welded to ABS sleeper strip; plain ABS chairs cyano'd to PCB sleeper strip; moulded ABS sleeper-base for plain track. My apologies for such a wavy example, which is all side-to-side (the rail is perfectly flat). Never mind the straightness, feel the chairs!