THE NEW PINEWOOD EXPRESS

Pinewood (Wokingham) Miniature Railway

ISSUE 28 March 2011

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NOTE: The Committee details are correct at the time of publication. Any revisions at the forthcoming AGM will be shown in the next issue.

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Cover picture

Mitchell Wyatt driving his 5" gauge Scamp.
Photo: Colin Gross, June 2010

EDITORIAL

It's a year now since I said goodbye to my last traction engine, one of the two that I had rallied over the past eight years, but since buying it I had always kept in touch with its builder who sadly died suddenly late last year. This has made

Photo Colin Gross

4" Scale Tasker A1. In the memory of Roy Masters, a talented engineer.

the anniversary of its sale more poignant, and only now do I realise how much I miss owning the engine and the pleasure that Roy's craftsmanship provided.

However, 2011 is here and once the cold weather improves it will be time to hit the workshop, add a few bits and pieces to my saddle tank loco "Gentoo", and then get on the track for the 2011 passenger season. I hope that all the club members and our future passengers enjoy the new running season.

SUBMISSION OF MATERIAL

Contributions for the future issues of the Newsletter are warmly invited. Contributions can be in any man- or machine-readable form. Original material should be marked for return, if required. All material, including text and photographs, must be the submitter's own work or the copyright holder must have given written permission for publication. Submission of material implies conformance to this. Submission also implies agreement that materials may be reproduced in relevant other Model Engineering and Railway publications.

CHAIRMAN'S REPORT

Well here we are in the first Quarter of 2011 and the club is a hive of activity once again, completing last year's projects and looking forward to the new challenges ahead.

Just to recap, 2010 saw us being awarded a lottery grant to install a new ticket office / classroom and to erect a canopy to keep our customers dry in the station area. We hosted the Polly Rally and made full use of the new steaming bays which have exceeded most people's expectations (I understand that the drawings will come later). We also entertained the Civil Service Motoring Association (CSMA) classic car rally, the Pinewood Site nursery school, a group of local child minders and their children; and we were winners in the Wokingham Times Community Cash draw for December.

So what are some of the challenges that await us this year ? Well we will be installing a mezzanine floor in the workshop to accommodate the two new coaches when they are built. We will be completing the refurbishment of all our existing coaches, with new bogies and the fitting of vacuum brakes. We have taken delivery of a quantity of aluminium rail which will be installed in the loop after the crossover so that we should be able to have two trains in the loop at any one time, and should you get bored there are always a few turnouts to be made. In June we have the Family day to look forward too, along with a visit from a classic car rally jointly organised by the CSMA and the Brooklands Museum. This is followed by the Pinewood open day in July, so all in all it looks like a very busy year.

Photo David Simmonite

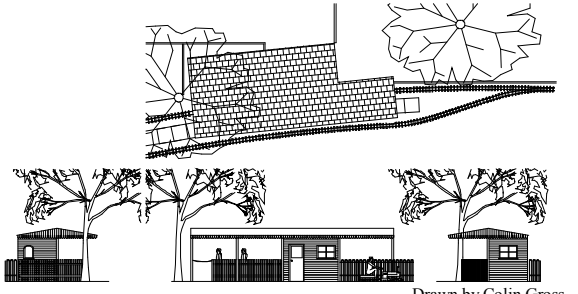
One of the new vacuum braked bogies for the passenger coaches.

I would like to take this opportunity to thank you all for the support you have given the club in 2010 because without it we would not be able to carry out the improvements to the railway in the way that we do.

SECRETARY'S REPORT

Following on from the previously reported excellent news of a lottery grant, I am pleased to confirm that we have now received planning permission to erect a new station with canopy. A basic design has been agreed and a contractor,

Buildings Bespoke, provisionally appointed to construct the building. Buildings Bespoke are a company of renown who have built many station buildings on preserved lines including the Swanage and Mid Hants Railways.



Drawn by Colin Gross

Plan and elevation sketches of the new station canopy and ticket office.

Draft plans have been submitted to the contractor and a final confirmed design is awaited. Much preparation work will have to be done prior to the erection and this will no doubt fall on the shoulders (and backs) of the Wednesday gang.

Still on the news of monies I am pleased to report that we were successful in winning the Wokingham Times Community Cash Token and our Treasurer is all smiles with the receipt of a cheque for £200. However, he points out that the need to seek out of any such sources of additional funding like this has never been so important if we are to keep enhancing the railway further and, more fundamentally, offset our ever increasing cost base. One of our most significant costs, site rent and service charges, will increase by 15% from April 2011.

We have recently received a joint approach from Brooklands Museum and The Civil Service Motoring Association to support a classic car rally. The rally is to be held on 11th June, starting at The Brooklands Museum in Surrey, arriving at Pinewood at 13.00. The intention is for us to run trains for two hours whilst the cafe provides food. The classic cars will then return to Brooklands at 15.00. The event will not only boost our funds but provide widespread publicity. The request has arisen because of the excellent support we offered to the local branch of the CSMA in support of a car rally last year.

The Yateley Fayre is being held on the May Bank Holiday, Monday 2nd May. As usual the club will be attending and operating a train service on the portable

track. If any members can come along to help, the early morning 07:30 to 08:00 and late afternoon 16:00 onwards are key times although help throughout the day is invaluable.

One last event to report is the site open day to be held on 3rd July. Basically all of the clubs accommodated at Pinewood are to take part with demonstrations, activities etc. We will be running trains in support of the event. Further details will be provided when they are available.

Finally it is the time of the year when subscriptions are due. I hope all of you will renew their membership; it must be worth the £35 just to receive the club's excellent magazine.

CHIEF ENGINEER'S REPORT

A considerable amount of work is now under way with small teams of members operating at various locations around the site on Wednesdays and Sunday mornings.

A list of jobs with progress shown is now available in the chalet. For those of you who find it difficult to get down to Pinewood the following tasks are deemed to be the most important.

- A complete overhaul of the electrics, except for in the chalet, to give us a more reliable supply.
- The installation of a new station canopy and ticket office with provision of space for training the junior members.
- Progressing the signalling "mimic" diagram and cabling.
- Construction of two new passenger carriages, and provision of storage space for them.
- Relaying of the head shunt track.

In addition there are also the regular maintenance activities to be continued so why not come along and lend a hand, all are welcome.

Photo David Simmonite

Realigning track panels.

The exit ramp from the new steaming bays, unkindly referred to as "The ski jump", is now essentially complete. Some concern has been shown in the past about runaway locos therefore it is intended to install a stop / catch point at the bottom of the ramp to protect the main line junction. Work has started on re-aligning the access roads leading to the turntable and the old ramp and at the time of writing this report the area looks like planning a model railway with all the track elements, which are handed because of the dual gauge track, being moved about for best fit.

Photo Paul Archer

The Ski Jump, aka Steaming Bay Exit Ramp.

Photo Colin Gross

The signal truck ensures safe storage and carriage of the signals.

The signal truck is now complete and progress is being made on painting the signals now that they can be stored safely.

New boarding is currently being installed at various locations around the site to prevent migration of the ballast which leads to uneven track. Visitors to the railway have made complimentary comments about the quality of the track so we must be doing something right.

Renovation of the two sit-in passenger trucks is well under way and these will be fitted with four new vacuum braked bogies. Much of this work has been done off-site by Derek Tulley and Tim Caswell both of whom deserve our thanks for taking the lead in this project. A further six bogies are under construction for the other passenger trucks with Tony Weeden doing much of the fabrication work. The old bogies, which could not easily be fitted with our standardised vacuum system, were found to be in sound mechanical condition and are being refurbished. We hope to offer them for sale, thus helping to reduce the overall cost of the coach works.

SIGNALLING REPORT

John Keane writes about the ongoing work to the signalling system.

The window in the signal box door was broken over the Christmas period, in the first case of vandalism of the signal box in over seven years. This was immediately repaired and we hope there will not be a repeat. The thought of having to cover the windows after each running day is off-putting as an additional end of day task.

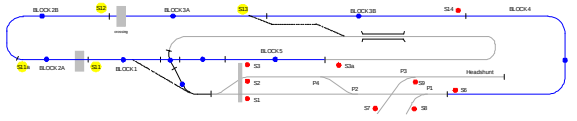
Photo John Keane

The newly decorated signal box with signal mimic panel.

Following on from Tim Caswell's repainting of the interior of the signal box, John Keane has continued with fitting it out for work surfaces and a housing for the mimic display – all finished in dark mahogany to match the antique bell housing. The mitred mimic frame is of 'all-bolted' construction to allow for easy future upgrades to the display.

Although the mimic relay board has been installed and most of the mimic cables are in place there is much left to do to complete the installation, including fitting the LEDs and probably pulling some additional mimic cables.

The signalling system has survived a fourth year with no system or component



A 'tube map' style has been adopted to give a clear display in the rectangular mimic space. Planned future extensions (the alternative route from the station and the return branch to the bridge) have been included. Peter Downes arranged for the mimic to be printed - and attached it to a backing board with pre-drilled holes for the 'block occupied' lights.

failures affecting public running, though we continue to have to replace a few failed track bondings – usually broken bonding wires or mysteriously loosened bonding bolts. Thanks to John Brotherton, these are usually quickly repaired and our ability to switch any signal in the 'fail-safe' system to 'yellow if occupied' rather than a false red means that running is never impacted.

In spite of reliability so far, there is a need to re-implement some of the connections in the signal pits, to remove the nests of wiring that have grown untidily and to lift some of the connections out of the damp before they cause problems.

JUNIOR SECTION

A report by Paul Archer, Pinewood's Junior Section Coordinator.

We have now reached the end of the first year of junior membership and everyone in the club is unanimous in recognising its value. Not only is junior membership the future of the club but we have also seen immediate benefits with support in all aspects of running the club.

Mark and David are regular visitors on Sundays throughout the year, undertaking a wide range of duties in support of our winter maintenance programme. In addition, they have been joined by William, Tom and Jamie on running days, undertaking a wide range of duties.

I am working hard to improve the performance of my "Polly" and hope that it will be available again next year to further enhance our junior driver training programme. All five juniors have had the chance to drive "Polly" and all have proved capable drivers. In the coming year we look forward to a full programme of training in all aspects of running our railway.

Photo Paul Archer

Junior member David Jones demonstrates his prowess in driving the Secretary's GWR "County" class at the Bracknell tracks snowy Boxing Day meet.

THANKS TO SANTA (and to Motorcycle Phil)

The two Santa Sundays for December 2010 were run successfully thanks to a lucky break in the snowy weather and the assistance of so many of the club members. The following comments received from some of the visitors to Santa are sent to all of you who helped make the event such a success.

Been before and had a great time. *FB, Finchampstead*

We ride the trains throughout the summer. *CS, Wokingham*

Used to live locally and ride all summer so have to come again. *PB, Aylsham*

This will be our fourth year of coming as the children enjoy it so much and it's so different. Thank you. *SS, Shinfield*

We come along each month. *MB, Crowthorne*

We come every year. *AA, Crowthorne*

We learned of these runs through using your fantastic miniature railway. *MH, Wokingham*

We have been to the railway many, many, times and still love coming. I know all the children will have a lovely time. We are looking forward to it. *AO, Wokingham*

However the club also owes its thanks to an unexpected helper, namely Phil of the Pinewood Motorcycle Training Centre. On the second Santa Sunday there was no electricity at Pinewood due to a supply failure. Without power we potentially had no Christmas lights, no hot mince pies, no mulled wine, no fairground organ for the carols and music, no signals, no power for the points, and worst of all no lights in Santa's Grotto to let the children see Santa. Phil very generously supplied a petrol generator to let us run the lighting. Thanks Phil, your generosity made a lot of children very happy and let us run a successful event.

Photo Colin Gross

Santa's Saviour.

P.S. Thanks also to Derek Tulley for spending all day bent over a small camping stove heating water and mulling wine.

Photo Paul Archer

"Moose Jaw" and "Old Glory" Double heading a Santa Special.

MAKING A POWER BOX FOR LOOPY LOU

John Brotherton explains why and how he modified his 5" gauge Jubilee Class Sentinel shunter.

Loopy Lou is an 0-4-0 yard shunter / pilot powered by a Rolls Royce diesel engine and built by Sentinel. No 10241, the loco started life at the Manchester Ship Canal along with four other identical locos. The loco was bought by South West Trains, rebuilt and upgraded to modern standards by Siemens for use at their maintenance depot for Desiros at Northam near Southampton. The name Loopy Lou is genuine, having been chosen in a ballot by the staff at the new depot. For those of you who may not know, the Desiros are new high tech, high quality, electric sets for use by South West trains all over the region. There are two types both built and supplied by Siemens, and they are 450 Class outer suburban units and 444 Class long distance units.

Photo John Brotherton

5" gauge Sentinel shunter.

Now to the model ! It is based on the Maxitrak 5" gauge Jubilee Class, but was modified, painted, lettered and built to my specification by Maxitrak who made a fine job of it. I was much impressed by the finish and detail put into the loco and the paint job was very nicely done. All this was achieved from one colour photo of the full-sized loco taken from a rail magazine.

Photo John Brotherton

The Power Box fitted to John's driving truck.

The two reasons for building the Power Box were to increase traction capability, by increasing the weight of the loco, and also the battery capacity (Ampere Hours). I also wished to use the gel type traction batteries.

To increase tractive weight I fitted a floor to the loco chassis so that I could add two steel bars under the floor and two 12 volt gel batteries above. These batteries work in parallel with the main traction battery in the power box. The

second reason for the modifications is my pet hate of non-scale controls sticking out of the back of scale model locos; so I removed the speed control potentiometer and switches from the rear radiator, filled in the holes and repainted. The only other additions I have made are working headlights and metal treads to the steps.

Now to the power box. I have tried to make the unit as unobtrusive as possible, so it is rather compact and tightly packed. The standard 4QD 35 amp speed control unit was removed from the loco and fitted in the box with an enlarged heatsink together with a TRAX Controls sound unit and elliptical speaker. The white box visible in the photograph is a standard Maplin squeaker unit for the air whistle.

Photo John Brotherton
Inside view of the Power Box.

To remove the need for a large high current switch for the electric brake I have used a relay as the brake switch in the traction circuit so that I can use a small push button switch on the power box control panel to operate the relay. All of this together with a 4 way terminal block for power connections is mounted on a piece of scrap plastic sign board supported by an angle bracket fixed to the inside of the power box. The 12 volt 24 ampere hour Yuasa sealed gel traction battery as used in golf trolleys and electric hoists is located underneath this board.

The power box is constructed from good quality plywood with the front side hinged so that the battery can be removed easily for changing when necessary. The top of the box / control panel is made from more scrap plastic. Starting at the top of the panel on the left, we have a 5 amp auxiliary fuse with the auxiliary switch next to it and an indicator "On" light. This controls all the 12

volt power except for the traction circuit. In the middle at the top we have the battery status unit supplied by 4QD. Below that there is the speed control lever as per full size. On the right we have the engine sound push button and indicator light, and the traction power switch. Next we have a large red button for the deadman's handle, and in the middle the Forward / Off / Reverse switch. Last but not least, on the lower row, the electric brake and horn push button switches and the Cove Locomotive Works logo. The aluminium angle fitted around the outside edge of the panel forms the turndown for push fit of the panel on the top of the power box.


Photo John Brotherton
The assembled Power Box showing the controls.

Finally an update on the full size Loopy Lou. Siemens now use a small electric sit-on unit instead of Loopy Lou for their shunting duties and have sold the loco to the Bluebell Railway who appear to have relaxed their "steam only" policy. The photo taken at Horsted Keynes in August 2010 shows that the Loopy Lou nameplates have been removed and that the loco is undergoing a much needed repaint.


Photo Colin Gross
Loopy Lou at Horsted Keynes (Bluebell Railway) on the 6th of August 2010.

WORKSHOP TIPS

Useful workshop ideas from toolmaker Peter Downes.

Tapping small holes in components is a big problem when tapping by hand. It is very easy to break the tap, and also it's hard to keep the tap square to the face. To overcome this problem it is best to use a tapping block. This can be made out of any scrap material, the one in the picture is aluminium and is about ¾" thick and about 1 ½" square.

Photo Peter Downes

A tapping block drilled for several different sizes of tap.

First clean up the block and chamfer all the sides and then pick a side to be the datum face; that is the face that the component will sit against. Next put a big chamfer around the opposite face so that you will always know the datum face. Always finish off your tools and jigs with clean faces and chamfers because a lot of tools look like scrap material. If it has been finished off properly you will know it's something useful and not scrap bar, even if you can't remember what it was used for.

Now measure the tap's shank and pick a drill that is about 0.1mm (4 Thou) bigger than the shank. Put the tapping block onto the drill table with the datum face down and drill the hole.

Note: You can use the same block for different taps by drilling different size holes in it.

When you want to tap a hole, put the component against the datum face of the tapping block and put the tap into the relevant hole. Then line up the tap with the hole in the component, clamping the component and block tightly together with your fingers.

Now when you tap the hole the block will keep the tap square and support it so you are less likely to break the tap.

PHOTO APPEAL

If anyone has photos of a busy Pinewood station during public running could they please e-mail high resolution copies to the editor for possible website use.

WORK IN PROGRESS

Paul Konig's 7 ¼" gauge King Class.

Work on Paul Konig's GWR 'King' continues at Andy Walton's workshop. Recent attention has been on the tender, with the re-gauging and profiling of all wheelsets plus the fabrication of a new tender tank (the original one was good in looks only). Work on the loco frames has also progressed well and the distinctive new double chimney has been positioned on the stripped smokebox. Hopefully some warmer weather will arrive soon, and with it the opportunity to progress painting, the next step before the loco starts coming together again.

Photo Paul Konig

The King in Andy Walton's workshop.

The loco attended its first AGM, that of the 7 1/4" Society at Kingsbury in September 2010, on Andy's "Denver Light Railway" trade stand and received a number of favourable comments. Although progress may be slower than first thought, the recent exemplary performances by Paul's C19 at the Santa Specials illustrate the excellent quality of Andy's work and we look forward to seeing the King at Pinewood soon.

Derek Tulley writes about gear cutting for a Long Case Clock.

The editor has asked me to pen a few words on the progress of my latest loco Fair Rosamund. It is now at a fairly advanced stage with the boiler cladding in place and most of the boiler fixtures and fittings completed. Unfortunately, as many of you may have read in Model Engineer, the designer Neville Evans has had severe heart problems which have stopped the design of the remaining parts. Hopefully by the time warmer weather arrives and I can get spraying the drawings for the remainder of the bodywork will be to hand.

This setback has however given me the opportunity to pick up another project put on hold when Neville asked me to build the engine. This was a long case regulator clock serialised in Engineering In Miniature a year ago. I had wanted to 'have a go' at a clock for some time and this seemed relatively simple as each hand has its own dial thus cutting down on the gearing. Before I could cut the gears I had to make up new division plates as those on my dividing head could not cut the numbers required. The new plate was mounted on the lathe spindle with a simple detent and the gear teeth cut on the blanks using a homemade flycutter mounted in a toolpost cutter grinder running at 6000 rpm. I was equally amazed and delighted when I got to the end of each wheel with a whole tooth which has subsequently successfully meshed. This was the first gear gutting I had attempted since my apprenticeship 50 years ago. After cutting the gear teeth it is necessary to 'cross out' the gears to reduce their inertia. I did most of this using fine endmills at max speed of my mill with the workpiece mounted on a turntable. This wasn't difficult but was very nerve racking as a wrong turn of a handle or an overshoot would destroy or spoil the work to date. Once machining was complete all that was required was to polish out all marks and scratches. I know all the gears mesh individually, so the next job is to fit all of the gears in the casing and hope that the clock will tick. The designer claims that the clock should be accurate to better than one second per week. As a first effort I will be happy if it ticks for a week irrespective of its accuracy. Watch this space in the next newsletter.

Photo Derek Tulley

Gear Cutting on the Lathe.

Photo Derek Tulley

Finished gears and escapement parts.

LED LIGHTING FOR MODELS (Part One)

The pitfalls, and solutions, when using LEDs for lighting by Colin Gross.

It is now becoming common to use Light Emitting Diodes (LEDs) to provide working lights on our locomotives, and in fact even the new main line locomotive Tornado utilises LED lighting. Most modellers know (or quickly discover when their LED goes up in smoke) that these devices need a resistor between them and the battery to control the current that flows through the LED. However most users are skilled mechanics, not electronics engineers, so they may not really understand what they are doing and the end result may be somewhat less than ideal. In this article I hope to explain how to install LED lighting correctly.

The first question is "what lighting is correct for the model" i.e. how many, and what colour, lights should be illuminated on each end of the model. There may be running lights, head lights, tail lights, head code lights, etc. Hopefully you will know this information if you are building a scale model, but if not (or the model is freelance) the publication **Visibility Requirements for Trains** by the Rail Safety and Standards Board will not only tell you what lights your type of locomotive should display (and their correct position) but also specify the dimensions of the yellow and black warning chevron pattern if it is applicable (the width of the stripes varies with maximum vehicle speed).

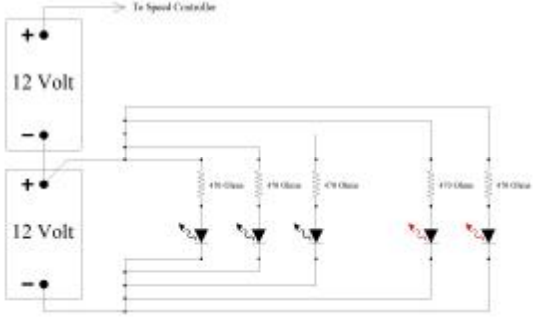
Now, for example, if you need three white lights on the front and two red lights on the rear you need to select your LEDs. Ignoring the specialist (and extremely expensive) LEDs you will normally have a choice of 3mm, 5mm, or 10mm diameter devices. If you need bigger lights then you can either fit a single LED behind a lens or use multiple LEDs which will increase the brightness of your lamp. Don't forget that many so called white LEDs actually have a blue tint to them so that they give a very icy cold white appearance when lit. If you have the choice, usually at extra cost, you could opt for a "warm white" LED which will have a more yellowy colour. However for most applications you can't

Photo Colin Gross

A typical LED lighting installation.

go wrong by selecting your LED from those suppliers like **Component Shop**. (Website page http://www.component-shop.co.uk/html/body_ultra-bright.html shows their selection of super bright 10 mm diameter LEDs.)

The first photograph of this article shows a typical LED lighting installation, where the builder has connected a resistor (the small red cylindrical thing with coloured rings on it is one of them) to each LED and then wired the LEDs across one of the locos 12 Volt traction batteries. The wiring diagram for this installation is shown below, the zig zag lines being the resistors and the things with squiggles by them being the LEDs. If you look at the wiring diagram you will see that one end of a resistor connects to one end of a LED. In electrical terms this is a **series** connection. Likewise, every series connected resistor and LED is connected to the +ve and -ve terminals of the 12 Volt battery. So every light (LED with its resistor) in electrical terms is connected in **parallel**. This is the simplest way of installing your LED lighting.

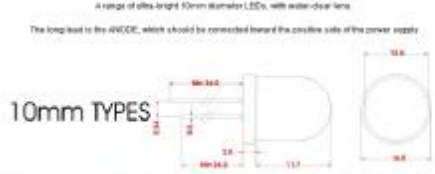


This installation leaves a lot to be desired. Look at the photo and you can see that there are a lot of loose wires which can easily get damaged, or broken, during the life of the model. There are even some bare bits of wire showing where no insulation (tape) has been applied. If any of these wires between the battery positive terminal and the 470 Ohm resistors were to become damaged and inadvertently connected to the battery negative terminal or its wiring (which is often connected to the metal structure of the model) then a short circuit will occur. As the battery can supply 100s of amps and the wiring is normally quite thin the result will be smoke, burnt wires, and potential damage to the model. At the very least a fuse should be fitted, using as short a length of wire as practical, between the battery positive terminal and the LED wiring.

This brings us to Ohms Law as you will need to understand the relationship between Voltage and Current to design your LED wiring installation.

Ohms Law provides the relationship between Current (**I**), Voltage (**V**), and Resistance (**R**) in the equation **I=V / R**. In other words, Current is equal to the Voltage divided by the Resistance. Please bear with me here as even if you understand this, it will probably be new to our junior members. This equation can be rearranged to show that **V=I x R** (Voltage is equal to the Current multiplied by the Resistance) or **R=V / I** (Resistance is equal to the Voltage divided by the Current). These three equations are almost all you require to design your LED lighting installation. However there is one more equation you will need, **P=V x I** (Power is equal to the Voltage multiplied by the Current). Those of you with mathematical knowledge will know how to combine / transform these various equations for all their permutations, but for anyone else you can get the answers you need with just these equations.

The "table" shown below is from the **Component Shop** website (click on the picture of your chosen LED to get this table) and shows the specifications for their 10mm diameter Super Bright LEDs. Before installing any LEDs you need some basic specifications for the devices, but although the specification sheet may look daunting, you only need to use a very few bits of information.



Colour		Red	Yellow	Green	Blue	Purple	White	Units	Conditions
Part No:		RL10-UR	RL10-UY	RL10-GH	RL10-UB	RL10-UV	RL10-WH		
Material		GaAlAs/GaAs	InGaAlP/GaAs	InGaN/GaN	InGaN/GaN	InGaN/GaN	InGaN/GaN		
Brightness	Min	2500	2500	5000	5000	300	6500	mcd	IF=20mA
	Typ	3500	4500	7500	7500	350	9000		
Viewing Angle		10	10	10	10	10	10	degrees	IF=20mA
Peak Wavelength		660	590	525	475	430	-	nm	IF=20mA
Dominant Wavelength		640	585	585	465	400	-	nm	IF=20mA
Spectral Line Halfwidth		45	35	25	25	25	25	nm	IF=20mA
Capacitance		45	20	65	65	65	65	pF	V=0V f=1MHz
Forward Voltage	Min	1.8	2	2.8	2.8	2.8	2.8	V	IF=20mA
	Typ	2.1	2.4	3.3	3.3	3.3	3.3		
	Max	2.8	2.8	4.0	4.0	4.0	4.0		
Reverse Current		10	10	10	10	10	10	µA	
Power Dissipation		110	100	170	170	170	170	mW	
Max dc Forward Current		25	25	25	25	25	25	mA	
Peak Forward Current		200	150	100	100	100	100	mA	
Reverse Voltage		5	5	5	5	5	5	V	

Operating Temperature	-40°C to 85°C
Lead Soldering	260°C for 5 seconds

The first, and most important, piece of information relates to the physical connection of the LED. You need to identify which "leg" of the LED is connected to the positive side of your wiring. The LED has two "legs", one being the Anode and the other the Cathode. In this specification sheet the information is near the top of the sheet; it tells you that "the long lead is the Anode which should be connected to the positive side of your power supply (battery)". If you get the wiring the wrong way round your LED will not illuminate, and may even be destroyed.

Next you need some "typical" values from the data sheet, but before we get to the complicated bit there is another aspect you should consider. If you look at your LEDs specifications you will see a parameter named **Viewing Angle**. Put simply, this tells you how far away from a "straight on" view that your LED will look bright. Generally speaking the brighter the LED the narrower this angle will become, although I could also add that "the more you pay the wider the angle **may** become". The choice is yours to make, but the Component Shop LEDs are apparently satisfactory on the clubs Class 20.

Now for the complicated bit. Look on the data sheet for "typical" values; in particular you need to find the typical forward voltage and typical forward current. These vary with the colour and type of LED. From this specification sheet, for a White LED, you can find that for the "typical" brightness the forward current (**If**) is 20mA i.e. 20 thousandths of one amp (0.02 amps) and that the "typical" forward voltage (at this typical forward current) is 3.3 Volts (note that it is only 2.1 Volts for a Red LED). What you need to work out is the value of the resistor that you will connect between your LED and the battery. In this case the nominal battery voltage is 12 Volts, and the LED will need a voltage across it of 3.3 Volts to operate correctly. This means that your resistor will need to have 12 - 3.3 i.e. 8.7 volts across it. The specification also tells you that the LED will have 20mA flowing through it, so Ohms Law now lets you calculate the resistor value. In this case the equation you need is **R=V / I** i.e. the resistor value is = 8.7 / 0.02 which results in a value of 435 Ohms. Unfortunately resistors are only sold with specific values (Google **Resistor Range E24** for tables of typical values) so you should always ask your supplier for (or select from their list) the next higher value. In this case it would normally be 470 Ohms. If you select a lower value the current flowing through the LED will be higher, which in extreme cases could damage the LED. Now before you rush to buy your resistor there is another factor to consider. As the current flows through the resistor it will get hot (think of an electric fire glowing red). So you need to select a resistor that will not overheat.

This is where the other equation **P=V x I** is used. Your calculations were based on the resistor having 8.7 Volts across it (for a white LED) and 20mA

(0.02 Amps) flowing through it. The equation thus gives the Power (**P**) as being 8.7 x 0.02 i.e. 0.17 Watts (Power is measured in Watts) for the white LED. The red LED works out at 0.2 Watts. Again, and unfortunately, resistors are only sold with specific power ratings so you will need to select / purchase a resistor with a higher power rating (Wattage) than the value you calculated. In this case they will probably be 0.25 Watts (i.e. $^1/_4$ Watt) rating.

Almost the final piece of this electronic jigsaw is the fuse that was mentioned earlier. This will protect your hard work from potential destruction so it is well worth fitting. The "typical" forward current for the selected LEDs was 20mA (0.02 Amps), so the TOTAL current the battery has to supply is the SUM of the LED currents. In this case we have five LEDs so the current is equal to 0.02 + 0.02 + 0.02 + 0.02 + 0.02 i.e. 0.1 Amps. (I have deliberately added the currents rather than stating 0.02 x 5, as in some cases different LEDs may use different "typical" currents.) The selected fuse must have a rating greater than this total current of 0.1 Amps (100 milliamps), so depending on where you buy your fuse from you will have to select it from the values they sell. A typical value for the fuse current in this case would be 160 milliamps.

Finally, the LED specification sheet has one more important bit of information. At the bottom of the table it states **Lead Soldering 260ºC for 5 seconds**. In other words, when soldering the LED connections you should not hold the LED lead on the soldering iron for more than 2 or 3 seconds, and that is if the soldering iron is on the outer end of the LED lead. Heat the LED for longer and you risk damaging it, or shortening its operating life. If you cut the LED lead to make it shorter then the soldering time would also be shortened as you are applying the heat closer to the electronic chip inside the LED. To protect the LED in this situation, use a small pair of long nosed metal pliers to hold the LED lead where it exits the plastic case of the LED while you solder the joint. The pliers will act a heat sink to stop the heat reaching the sensitive chip inside the LED.

Colin's 5inch gauge Hercules showing "warm white" running lights and "icy blue" head lamp.

This information should let you install basic LED parallel lighting to your model, but Part Two of this article will provide tips on how to make good installations and how the use of a single semiconductor device can drastically simplify your wiring and protect it under fault conditions.

PINEWOOD SITE RULES

Below are some of the Pinewood Site Rules that are of relevance to us. Please obey them.

1) Opening Times and Access
   The site is open between 7.45am and 11.00pm and access is allowed only via the gates or the kissing gate.
2) Parking
   Parking must only be in marked bays / areas. Roads, pathways and set down areas must not be obstructed. Vehicles must not be parked on the grass verges, including that to the South (Scout hut and W.C. side) of the railway site approach road.
3) Speed limits and traffic directions.
   All users are required to observe traffic directions and speed limits. The maximum speed allowed is 15 miles per hour.
4) Liability.
   The public whether or not members of any club, society or tenant using the site do so at their own risk and must exercise care for their own well-being. Children must be supervised. The ponds, stream and woodlands roadways and car parks are all hazardous areas.

PUBLIC RUNNING DUTY ROSTER 2011

Date	Officer in Charge	Assistant
April 17th	Keith Briault	John Ephithite
May 15th	David Prichard	John Brotherton
June 19th	Mike Cole	Trevor Hill
July 17th	Peter Downes	Alan Davies
August 21th	David Simmonite	Tim Caswell
September 18th	Ray Grace	Roger Marney
October 16th	John Keane	Peter Starr
December 4th and11th	Santa Runs	

Please note**: If you are unable to make the date on the roster could you please let Keith Briault know as early as possible.**

DIARY DATES 2011

External events are in **bold** text. Please check dates before travelling.

DATE		EVENT	
MARCH 2011	Wednesday 16th	AGM in the Bracknell Railway Society building.	19:30
APRIL 2011	Sunday 3rd	Members' Running.	10:00 - 16:00
	Sunday 17th	Birthday Party, Public Running,	11:00 - 13:00 13:30 - 16:00
MAY 2011	Sunday 1st	Members' Running.	10:00 - 16:00
	Monday 2nd	Yateley May Fayre	Help needed 07:30 onwards
	Sunday 15th	Birthday Party, Public Running,	11:00 - 13:00 13:30 - 16:00
June 2011	Sunday 5th	Visit to Fawley Railway. Details to follow.	
	Saturday 11th	Brooklands / CSMA Car Rally.	13:00 - 15:00
	Sunday 12th	Family Day.	10:00 - 16:00
	Sunday 19th	Birthday Party, Public Running,	11:00 - 13:00 13:30 - 16:00
July 2011	Sunday 3rd	Pinewood Centre Open Day. Public Running.	 Times to be advised
	Saturday and Sunday 9th & 10th	**Guildford Model Engineering Society. Model Steam Rally and Exhibition.**	
	Sunday 10th	Members' Running. and visit by Mid Hants P'Way gang.	10:00 - 16:00 Provisional
	Sunday 17th	Birthday Party, Public Running,	11:00 - 13:00 13:30 - 16:00
August 2011	Sunday 7th	Members' Running.	10:00 - 16:00
	Sunday 21st	Birthday Party, Public Running,	11:00 - 13:00 13:30 - 16:00
September 2011	Sunday 4th	Members' Running.	10:00 - 16:00
	Sunday 18th	Birthday Party, Public Running,	11:00 - 13:00 13:30 - 16:00
October 2011	Sunday 2nd	Members' Running.	10:00 - 16:00
	Sunday 16th	Birthday Party, Public Running,	11:00 - 13:00 13:30 - 16:00
December 2011	Sunday 4th &11th	Santa Specials Please come along to help	 08:30 - 17:00