



Goodwin Park News
Spring 2020

Club Details

The newsletter of Plymouth Miniature Steam. Published quarterly (normally March, June, September & December) and issued free to members. **Cut-off date for submissions is 24th of the preceding month (i.e. Feb, May, Aug & Nov).**

We operate a ground level track of approximately half a mile in length at our site at Pendeen Crescent, Southway, Plymouth, with facilities for 3½, 5 and 7¼ inch gauges. Public running occurs on the first and third Sundays of each month, from April until the end of October.

For further details and membership information, please contact Ian Jefferson (01752-788862) or Rob Hitchcock (01822-852479).

Current Membership Rates - Adult £25, Junior £10.

Workshop facilities available to members at 'Tor Bridge High' (was Estover Community College), Plymouth, £25 per term (10 weeks) or £3 per session.

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We also operate an email message service within the membership; if you wish to join, please contact 'the membership secretary'

Please note that contributions reflect the views of the writer and are not necessarily endorsed by the Company.

Members' advertisements for models and other related items are published free.

Non-members and Trade, by arrangement. All items for inclusion to be sent to the Editor.

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Your committee for 2020

Ian Jefferson	Chairman
Nick Hill	Vice Chairman
Ursula Brown	Secretary
James Atkinson	Treasurer
Selwyn Brown	Track Marshal
Alan Smith	
Bob Sims	
Ti Daley	
Rob Hitchcock	

Please make sure that any change of address, email or mailing preference are notified to the membership secretary promptly in order that we can keep you informed. If you do not wish to receive communication by phone or email, please ask the membership secretary to delete that information.

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Front Cover:

Goodwin Park under construction Sept 1988 – Photo Richard Kellaway

Editor's Ramblings:

I am sure many of you will remember John Brooker who was our Treasurer for many years. Jean Brooker has kindly made a donation of £500 to the club from the recent sale of John's 3½" gauge Shay locomotive.

Obviously the timing is good considering the amount of work that is currently happening on the track.



Photo: Pat Gilpin

From the Chair

February and already the thought of the start of the public running season in April is looming large for me. The past 3 months have simply disappeared and already 2020 is positively racing through.

Despite the poor weather over the past months with copious amounts of rain, a small band of members have worked, often in appalling conditions to progress this year's round of maintenance. The rain has impacted the work, such that quite a bit of time has been lost simply in coping with the rain, resultant wet clothing and cold, wet tools. Nevertheless it is hoped that by the time you receive this, the outdoor work will have been completed, so we will then have improved access around the western side of the clubhouse and an extended platform with improved drainage. Repairs will also have been completed to a few bad sections of track and the severe dip in the shed road by the western end of the clubhouse. Preparations have also been made to improve the safety of the main line connection, with the provision of an interlocked 'escape line' and eventually an unloading ramp; whilst this will take quite some time to complete, the work done this winter will provide the foundation for the first stage. Work has also taken place to improve the provision of signalling cable to avoid the need to roll out lengths of cable alongside the track each day, whilst avoiding the degradation and corrosion problems we experienced with the previous fixed cabling arrangements. This means that further work will be required to the signals themselves, but hopefully the end result will be worth the effort and wait.

As we approach the end of the 19/20 track maintenance, thoughts are already turning to the work that will be undertaken in the 20/21 closed season. Looking at the areas that are in need of attention, the one that is standing out is the crossover at the eastern end of the site and its approaches. The approach from the station and the first crossover point were dealt with a couple of years ago but the remainder is in a poor condition and the track levels are not what they should be. The proposal being considered is therefore to lift the second point, the crossover track and the 3 remaining approaches for a distance of 15 to 20 metres each, in order to replace the base and rails whilst restoring the desired levels.

From the Chair

Whilst the track maintenance has been progressing, elsewhere, effort has also been put into other work. The annual maintenance on Fred was completed early, as her presence had been requested at the Plym Valley Railway for their Christmas specials. Having worked the 4 weekends in December, she returned to Goodwin Park on January 1st for our members' day, unfortunately her month away had resulted in heavily clogged tubes so she could not produce sufficient steam. This required a thorough cleaning and not just of the tubes! Now cleaned, she is almost ready for the start of our normal public running in April. The annual maintenance on the 2 electric locos is under way, so they should also be ready for April. Hernia is however still 'in the works'. 3 months ago, the horns were being recut to achieve new reference faces, that were at least vertical. Having completed this, they were removed, so that steel facings could be fixed to the working faces. Once completed, the horns were refitted with new fastenings and everything measured, ready to re-machine the axleboxes. This was expected to be the most difficult machining operation as there were no useable references, so they had to be treated almost as if they were new castings. So it was that one by one the axleboxes were machined, not just to fit the horns, but also to set the axles square across the frames. In machining each box, the first face just had to be a specific distance from the axle, whilst the second had to match the horn gap with an acceptable working clearance. In the end this was achieved with minimal working clearances. With everything now appearing to be ready, final reassembly could begin, so as 2019, became 2020, the paint and brushes came out to get the frames 'up to scratch'. Lubrication grooves were cut on the faces of the axleboxes, the old rubber block springs were replaced with new coil springs, to improve the rear suspension whilst retaining the stability required to keep the valve timing correct. With the frames



Hernia back at Goodwin Park

beginning to look like a locomotive and getting quite heavy again, as February dawned the time had come for them to

From the Chair

return to Goodwin Park for the remainder of the rebuild.

And so the reassembly has begun. One of the oddities of this design is that it is necessary to have the bunkers fitted, before the valve gear can be completed and it is necessary for the boiler to be in place, before the bunkers can be fitted. So the boiler has been returned to the frames and its lagging begun, the cladding has been repainted and it will then be refitted along with the bunkers. Meanwhile, the cylinders and motion will be replaced and once all is there, the final adjustments and valve setting can be done. This sounds fairly straightforward but there are many other small bits to deal with and as we all too often find, it is these apparently simple jobs that end up causing the most difficulty. So whilst I am hopeful that she will be available for the beginning of April, there is the clear possibility that her return may be slightly delayed and of course there will have to be a period of 'running in' before she is fully ready for service. I just hope that the effort I have put in during these past months will keep her going for several years to come.

And so as we hurtle towards the beginning of April, we face up to the challenges that a new year brings, I am sure they will be many! One that I am trying to deal with, is the amount of accumulated debris in the clubhouse, much of which has been donated with the best of intentions, but having languished for many years has now become a burden. Unfortunately, some will have to be disposed of, but anything that appears to have value will first be offered to a new home.

So let us go forward to 2020 and face up to the challenge, working together for the benefit of the club.



Goodwin Park 1988 & 2020



1988 Richard Kellaway



2020 Dave Biss

AGM Report

Ian Jefferson

The club AGM on February 27th was attended by the 20 members required to form a quorum, representing one quarter of the membership. With the introductory matters dealt with, the officer's reports all concentrated on the financial situation, which is quite healthy, thanks to the grant we received from the council last year. The ongoing work on Hernia was also referenced as this is still occupying a significant amount of time. Although the current financial situation is good, the prospect of rising costs in the coming years raised the matter of members' subscriptions in the coming years. With the officers' and scrutineer's reports accepted the committee stood down and John Briggs took the chair to oversee the election of the new committee.

As no new nominations had been received, no offers were forthcoming from the floor and the existing members had signified their willingness to continue, the committee was re-elected 'en bloc'. This was followed by the election of the members to fulfil the other roles, again these were returned without opposition, although John agreed to join the team of scrutineers. It was also noted the Sophie would still appreciate being relieved of the role of webmaster, by someone closer to the regular activities of the club.

With the new committee now in position, thoughts turned to the future. Nick outlined the work that is proposed for the 20/21 closed season; this involving the relaying of the crossover at the eastern end of the site and some improved drainage. This is a crucial piece of infrastructure, both from the point of view of availability of the track and as a reference level for other renewals. Authorisation was then sought and granted for the anticipated expenditure of between £5,000 and £7,000. There then followed a protracted discussion relating to the level of subscriptions in future years; with the 'fixed' costs of insurance, rent and magazine amounting to over £3,000 and a membership of between 90 and 95, it is clear that these costs are being subsidised by the public rides. The result of this was the recommendation that subscriptions rise to £28 and £10 from next year.

AGM

During the meeting, those present were asked to indicate their support for the choice of which charity we should support for the next two years and at the end of the meeting it was declared that we should once again support 'St Luke's Hospice' in memory of Colin Blunden who died late last year.

Your committee for 2020:

Ian Jefferson	Chairman
Nick Hill	Vice Chairman
Ursula Brown	Secretary
James Atkinson	Treasurer
Selwyn Brown	Track Marshal
Alan Smith	
Bob Sims	
Ti Daley	
Rob Hitchcock	

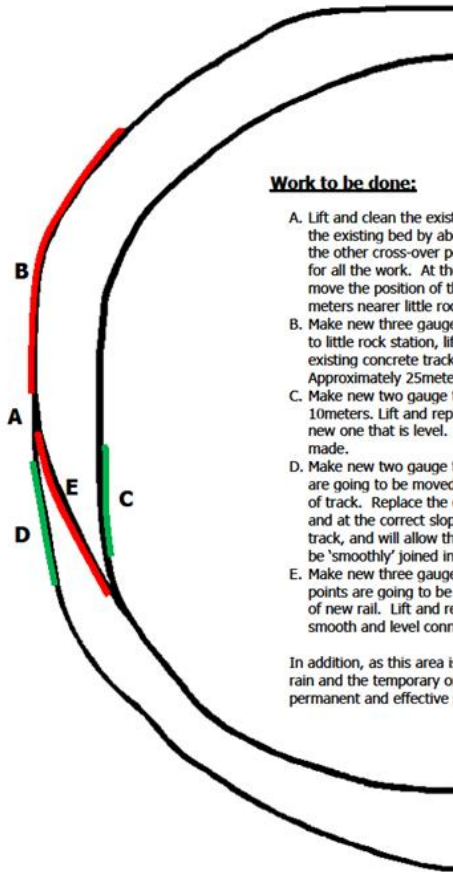
Other Roles:

Scrutineers	Malcolm Preen, Rob Hitchcock, John Briggs
Membership secretary	Sue Jefferson
Insurance secretary	John Briggs
Magazine Editor	Dave Biss
Webmaster	Sophie Brown
Apprentice trainer	Rob Hitchcock

Proposed Track Repairs

Nick Hill

Winter 2020/21 Proposed Repairs.



Work to be done:

- A. Lift and clean the existing points, so that they can be reused. Raise the existing bed by about 100 to 130mm to allow re-alignment with the other cross-over points that will be used as a reference point for all the work. At the same time, when the concrete is poured, move the position of the points so that they are about two-three meters nearer little rock station.
- B. Make new three gauge track to run from the points to the approach to little rock station, lift existing track and track bed. Replace the existing concrete track bed with a new one that is level. Approximately 25meters of track to be made.
- C. Make new two gauge track to run from the existing points for about 10meters. Lift and replace the existing concrete track bed with a new one that is level. Approximately 10 to 15meters of track to be made.
- D. Make new two gauge track to replace the existing rail, as the points are going to be moved, this is going to be approximately 15meters of track. Replace the existing concrete track bed so that it is 'level' and at the correct slope to allow a good transfer to the existing track, and will allow the remaining track to the vehicle crossing to be 'smoothly' joined in the future, when it is replaced.
- E. Make new three gauge track to replace the existing rail, as the points are going to be moved, this will be approximately 20meters of new rail. Lift and replace the existing concrete bed to give a smooth and level connection to the reference points.

In addition, as this area is prone to flooding during periods of heavy rain and the temporary one has had some success, hopefully a more permanent and effective solution will be installed.

Estimated work and materials:

1. New track to be made:
 - Twin gauge = 25m (approximately)
 - Triple gauge = 45m (approximately)
 - Quantity of steel bar (10x20mm) = 90 lengths of 6m steel bar, already at the site.
2. Lengths of concrete base = 85m (approximately including the re-used points)
Estimated volume of concrete required = 15m³ or 30 metric tonnes (approximately) so this will have to be pumped.

The aim is to template most of the new track during this year's running season, thus reducing the work over the winter.

The Hydrogen Economy

John Briggs

I discovered the 'hydrogen economy' almost 20 years ago whilst acting as treasurer for a local investment club. It was my pleasant duty to buy and sell the shares and, after research into the energy sector, the club chose biofuels but I decided that hydrogen had more to offer and bought shares on my own account. My hydrogen shares soon fell by 70% and mostly stayed there for almost 2 decades - until recently;

I noticed a news item showing a drone powered by hydrogen in compound form with the advantage of greater endurance over a battery powered drone, plus there is also increasing mention of hydrogen in the media and, sure enough, the shares have started rising.

The Energy Market

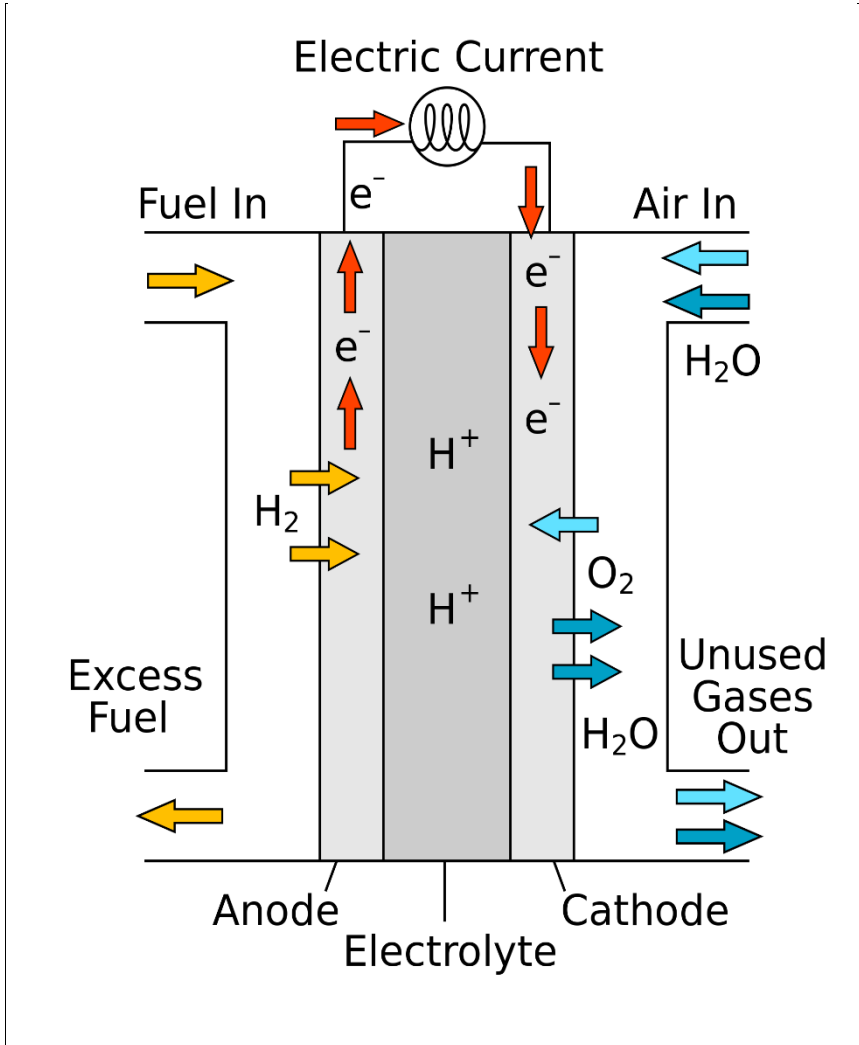
The global market for 'green energy' is vast. Hydrogen can be used for mobility (fuel cells), as a building block in chemistry - eg. producing feedstocks, and can convert excess power into gas energy storage; it can also be injected into gas distribution networks up to 20%.

Government Policies

Many governments are adopting policies to replace fossil fuels with 'green' alternatives. In the field of transport, car makers are planning to replace the internal combustion engine, the most visible alternative being the 'electric vehicle' (ev), increasingly being labelled the 'battery electric vehicle' or (bev) to distinguish it from the new kid on the block - the 'fuel cell electric vehicle' or (fcev).

Fuel Cells - How Fuel Cells Work

In its simplest form a fuel cell has an anode and a cathode immersed in electrolyte; hydrogen as a fuel is presented to the anode and oxygen at the cathode. The movement of positive ions and negative electrons produces electrical energy, heat and water as the only waste product. The following diagrams seek to explain this process:



R.Dervisoglu - Own work, based on http://en.wikipedia.org/wiki/File:Solid_oxide_fuel_cell.svg

Hydrogen Economy

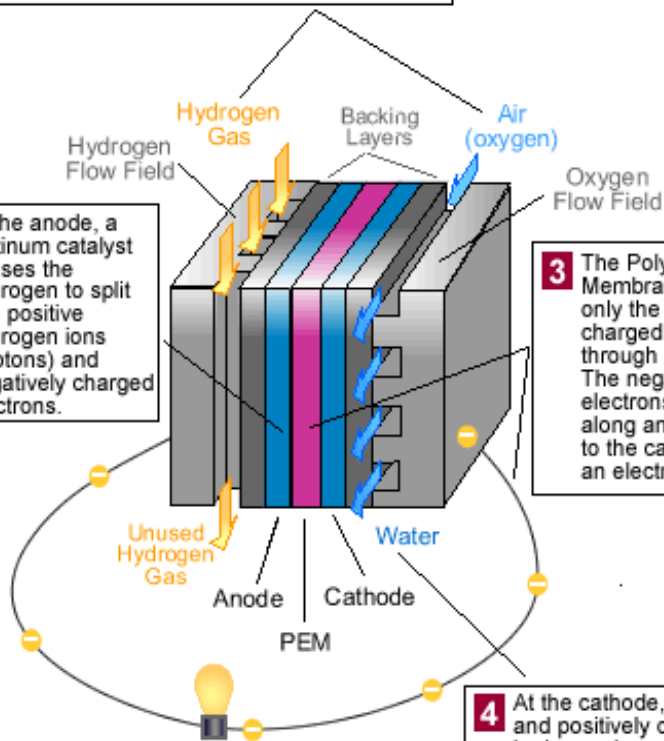
Department of Energy

1 Hydrogen fuel is channeled through field flow plates to the anode on one side of the fuel cell, while oxygen from the air is channeled to the cathode on the other side of the cell.

2 At the anode, a platinum catalyst causes the hydrogen to split into positive hydrogen ions (protons) and negatively charged electrons.

3 The Polymer Electrolyte Membrane (PEM) allows only the positively charged ions to pass through it to the cathode. The negatively charged electrons must travel along an external circuit to the cathode, creating an electrical current.

4 At the cathode, the electrons and positively charged hydrogen ions combine with oxygen to form water, which flows out of the cell.



The Fuel Cell Electric Vehicle (fcev)

In the fcev, the fuel cell supplies power to a battery and the battery powers the electric motor. Hydrogen is stored at 700 bar (10,000 psi) in a cryogenic tank with a thin polyamide liner and a 20 - 25 mm outer of reinforced carbon fibre and epoxy; this

Hydrogen Economy

combination has 6 x the strength and 4 x the stiffness of steel. The high pressure is first reduced to 16 bar and finally 1.0 - 1.5 at the anode.

Refuelling Points

These can be sited at any garage forecourt. Each independent unit utilises either wind or solar energy to electrolyse water producing hydrogen which is then pressurised to 700 bar. Access to use the recharging point is by means of an RFID card made available after attending a short training session. Recharging points can be supplied by road tanker but this should not normally be necessary. Refuelling takes 5 minutes and gives a range of about 381 miles. The Tesla, a leading bev, takes an hour to recharge with a smaller range. Elon Musk, of Tesla fame. dismisses the claims made for the fcev as bullsh*t; Toyota obliged by making hydrogen from bullsh*t and drove their Mirai on it. His criticism highlights the inefficiency of the fuel cell - electrolysis is 60% efficient and pressurising the gas reduces this to 40%.

The Manufacturers

FCEV's in production to date are from Hyundai (Nexo SUV), Toyota (Mirai) and Honda (Clarity). BMW, Audi and Mercedes Benz all have plans to introduce fcev's.

Current Usage

South Korea, Japan and California are the most advanced. A snapshot of their activity is as follows:

- South Korea - Produced a master plan in 2005 followed by a road map for the hydrogen economy in 2019. In 2018, South Korea had 18,000 units in use, 8,000 of them domestic; they plan 810,000 by 2022 and 6.2M in 2040
- California - In 2020 California has 8,098 units in operation plus 42 fuel cell electric buses (fceb's). There are 42 retail hydrogen refuelling stations.
- Japan - There were 3,521 fcev's in 2019 and 22 fceb's.
- United Kingdom - There are 13 hydrogen stations in the UK., 4 in the north and the rest near London/M25/M40 and Swindon. The government programme is called "UK Hydrogen Mobility" and proposes 1.5M fcev's by 2030

Hydrogen Economy

Price Example

Manufacturers are still in a trial phase and most fcev's are leased rather than sold. In California I have seen price of \$58,300 (£44,846).

Safety

Hydrogen vaporises and disperses rapidly in air and there is no fire risk. The burst pressure of the cryogenic tank is 1575 bar and it is designed to deliberately discharge the gas in the event of sensing extreme temperature.

The Future

Supporters of the bev may try to strangle the fcev at birth, if they can, to reduce competition; the next few years are crucial if the hydrogen industry is to be widely adopted. Fuel cells are currently in use in cars, buses, lorries, stationary back-up units, a 34 ton catamaran and even a drone. My best guess is that both the bev and the fcev will play a part in replacing fossil fuels, not least because some estimates project a necessary doubling of the national grid if all vehicles converted to battery electric as the only option.

JB



Bob Sims' Percy at Goodwin Park (Ed - just an infill photo!)

Diary Dates

Club Diary Dates 2020

26/3/2020 *	End of Spring Term – TorBridge High
05/4/2020	Public Running Sunday
12/4/2020	Committee meeting and members' Sunday
16/4/2020 *	Start of Summer Term – TorBridge High
19/4/2020	Public Running Sunday
3/5/2020	Public Running Sunday
10/5/2020	Committee meeting and members' Sunday
14/5/2020 *	Torbridge High – last of first half term
17/5/2020	Public Running Sunday
24/5/2020	Summer Magazine press date
4/6/2020 *	Torbridge High – start of second half of term
7/6/2020	Public Running Sunday
14/6/2020	Committee meeting and members' Sunday
21/6/2020	Public Running Sunday
2/7/2020 *	End of Summer Term – TorBridge High
5/7/2020	Public Running Sunday
12/7/2020	Committee meeting and members' Sunday
12/7/2020 TBC	Summer Barbeque
19/7/2020	Public Running Sunday

***All Torbridge dates are now TBA (due to school closures).**

And as regards the public service (and members' days) we will be taking a final call on the 29th March and will mail out the decision as soon as possible thereafter.

The "Tuesday Gang"

Meet weekly at the track from 10:15 to 12:15. The jobs tackled include mowing, DIY on the building, maintenance of locos and rolling stock, painting bridges etc.

Workshop Evenings *

Workshop facilities available to members at 'Tor Bridge High', Plymouth.
£25 per term (10 weeks) or £3 per session. Thursday eves (6:30-8:30pm) during term time.

Members' Evenings

Just a reminder that the club no longer holds the Spring & Autumn members' evenings.