

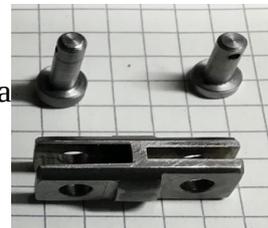
# GUIDELINES FOR TETHERED CARS AT BUCKMINSTER 2021

BY STEVE BETNEY.

In preparation for post-Covid freedom to operate our cars on the Buckminster track, here are some guidelines and information on matters which might not be familiar to all SAM members and others who want to make Retro/Vintage/Sport type tethered cars and get involved. It will not be possible to cover all possible aspects here, just some of the main points and FAQs.

The Buckminster track is built to the most common European size, and speeds are timed over 8 laps, representing a travelled distance of 0.5km. The actual radius from the centre of the pylon to the car centre line is 9.95m, and circle diameter is 19.90m.

The tether cables are made from high spec piano wire to a specific design, to ensure safe operation within the limits set out in the table below, and have a FEMA-style connector to attach to the model. These are NOT full International FEMA racing standard cables and are not suitable for such cars with their much higher speeds and stresses. We have arranged for a friendly supplier of these special Buckminster cables and the necessary connector to your car's bridle at very reasonable cost from Pavel Pirov in Latvia. You can contact him at [pps61@inbox.lv](mailto:pps61@inbox.lv) to buy your own cables by Paypal so you can operate at the track at any available time, though they will be provided by organisers for formal events at the track. Each cable must be pull tested to the tension shown below before use and periodically thereafter, just like for control line aircraft lines, and a lever-operated test rig will be stationed at the track this year so that this can be fairly easily and safely done, some of the test loads are large as you can see.



## CAR CLASSES AND CABLES FOR BUCKMINSTER.

CLASS	MAX WEIGHT		MAX SPEED		CABLE		PULL TEST	
	LBS	KG	MPH	KPH	Dmm	COLOUR	LBS	KG
1. 1.5cc	2	1	115	185	0.5	WHITE	55	25
2. 2.5cc	3	1.4	144	232	0.8	GREEN	131	59.5
3. 5.0cc	4.5	2	148	238	1.0	RED	196	89
4. 10.0cc	6.5	3	143	230	1.2	BLACK	275	125

To use the track in either a SAM organised event or casually, you will need to pay the standard BMFA Buckminster day entry fee for the site, and you must be able to prove that you have their standard flying insurance which covers these cars. If you do not

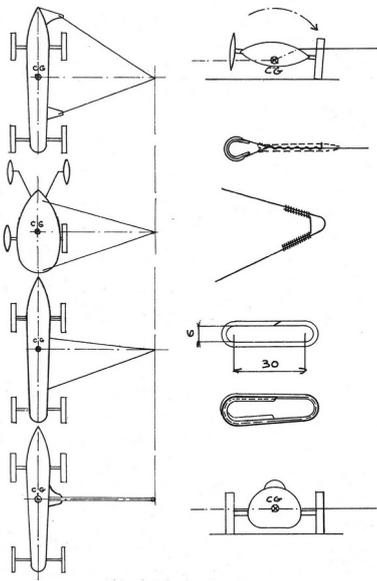
have or want BMFA membership you will need to take out the lower cost insurance only policy which can be arranged by phoning their head office. Family members and spectators not running a car or using the flying field facilities are not charged the day fee.

It must be stressed that single handed operation of tethered cars is not safe or allowable, you must always have a helper to man the centre pylon to “horse” your car away into its run, and this is a bit of an acquired skill for different types of car so will require some practice. Small groups are to be encouraged, more fun.

All cars should be fitted with effective fuel (or spark ignition) shut offs wherever possible for safe operation. For aircars where it is not possible to fit a shut off, a “smother blanket” or special flag-like device must be available to stop the engine in potentially dangerous situations. Do not fit large fuel tanks to aircars, just big enough to be able to start and complete the 8 laps with not too much more to spare is ideal.

We can not cover all aspects of car design here, but the method of attachment for the car by its bridle to the tether cable connector is a most important one. It is virtually impossible to specify bridles for all Old Timer/Sport and Vintage tethered cars as the designs changed rapidly over the 1940s period to date. A common measurement is that the distance from the single attachment hole centre on the bridle is exactly 9 inches to the car centre line (British standard forever), and never more than 10 inches. There are two main types of bridle: the “Pan Handle” style of mild steel (or Grade 5 titanium) bar, 2.0mm thick for 1.5/2.5cc, 2.5mm for 5cc and 3.0mm for 10cc cars. The other is the wire V type bridle attached to two hard points towards the front and rear parts of the car body. Make and attach these according to the car drawings that you are building from, but do ensure that the attachment hole in the bridle for the fastener pin is 4.5mm diameter for 1.5cc and 2.5cc cars, and 5.5mm for 5 and 10cc cars, and that the distance of the outer edge of this hole from the rounded end of the bridle is no more than 2.5mm for 1.5/2.5 cars and 3.0mm for the larger cars, otherwise you won't be able to hook onto the tether line fastener pin. There is a really interesting and useful document available, the FEMA Technical regulations 2018 Rev 2, downloadable from [www.speedmodelcar.org](http://www.speedmodelcar.org), which covers bridle specs on pages 7 and 8. It covers all aspects associated with the design and running of racing cars and is well worth studying in depth, but be aware that they have 5 different engine capacity classes rather than our 4, and much thicker cables (up to 2.1mm diameter) and other requirements because of the greater racing speeds and stresses.

It is essential to balance and trim your care for safe and successful running, just as for model aircraft, and the vintage diagram here from a 1950s French Vega car models brochure shows this (ignore the split connector

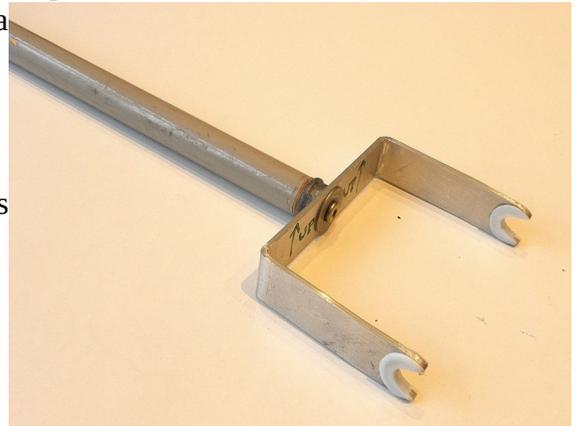


drawn, you will be using the different fastener type mentioned earlier). You must ensure that all of the wheels are in meticulous and perfect alignment so that the car will track straight and definitely not into the circle. When hung from the bridle attachment hole to the attachment fastener pin, the car must hang so that it is parallel to the ground, and must also hang exactly vertical from the line. Some old car plans and even some commercially manufactured cars have the bridle attachment point(s) incorrectly located, so you must ensure that all cars are checked and adjustments made by relocating wire bridle hard attachment points where necessary, or possibly relocating the position of bolted-on panhandle bridles, which may even require bending (usually upwards) to achieve the correct vertical hanging position on the line. Some ingenuity will be required to achieve this with improvised jigs, knife edge balances and string and gaffer tape, but you're all modellers after all, so you'll find a way.

How do you start to run your car on the track? This is easy and familiar if your car is a propeller drive aircar. Before you enter the circle, fuel up your model to keep fuel off the track surface and give your engine a test run to

get the settings, then stop it and enter the track and attach the tether line to your model with the approved fastener. Start up your engine, ensure that the horser at the centre pylon is ready, then after a signal just give your aircar a gentle push forwards, ensuring that it isn't pointing into the circle at all, then quickly get behind the safety barrier and watch your model accelerate up to speed with some gentle assistance from the horser to ensure that the tether wire doesn't snag on the inner circle grass and get pulled off the track. This can be expensive, as sharp aircar props can nick or kink the tether cable and render it unsafe and useless, so it's best to always have a spare one available between friends to save delay in getting a new one when this happens. If you are going for a timed run, when the horser has climbed onto the pylon platform and your car is up to speed after a few laps, either raise your arm to signal to the timekeeper to start timing or depress the digital timer start button if one is in use, and the run will be timed over 8 laps/500metres.

If you are running a twinshaft engine powered car, or one with a geared drive from a single shaft engine without a clutch fitted, you will need a starter push stick like the one pictured here. Make up the end from bent mild steel or medium hard aluminium of about 1 inch x 1/8" section with smooth semi circular cut outs on the prongs to fit over your twinshaft engine's crankcase housings or the actual rear axles on a gear driven car, and bolt this securely to a broom handle or similar. The width between the prongs should ensure that these clear the car sides and do not foul the insides of the drive wheels. It is possible to successfully use just a single prong stick used on the inner axle, but I've always found the yoke type easier to use. Ensure that



your engine is well set up in the pits, you will never be successful trying to do this on the track. Use an rc car type starter box or a good old fashioned starter cord on the flywheel for single shaft engines to start them to establish these settings. For twinshaft engines, it is ideal to run them in with a suitable sized propeller in place of one of the drive wheels and achieve the ideal settings. Warm the engine up in the pits, stop it then fuel up before moving onto the track. You may need to give a further short test start when hooked onto the tether cable to make sure that the engine is still warm and ready to go, then when the horser is ready, give him a signal and place the push stick over the rear axles and apply downward pressure whilst starting to run forwards and vigorously push it away to hopefully start the engine and get away. If you are using a glow engine rather than a diesel, the easiest way of operating is with an onboard automatic electronic glow igniter and small lipo battery which cuts out around 15 to 20 seconds after setting.

If you are using a car fitted with a clutch, starting will be either by cord in the flywheel groove or using a 12v aero engine starter with a special (readily available accessory) rubber wheel attachment pressed against the flywheel to turn the engine over. Getting clutch driven cars away on the track is much easier than for twinshaft and gear driven cars, as the car starts to accelerate gradually after release until the clutch is no longer slipping and full speed is achieved.

Well, I know that the above is a lot of information to take in in one go for anyone, but don't let it put you off, it may be as well to copy or print it for reference for re-reading a few times at your leisure over the winter period., and do read the FEMA Tech Regs document too. Happy building!

