

Beachlands Maraetai Trolley Derby 2018 Entry Form

Name of Driver (<i>one form per driver</i>)		OFFICE USE ONLY	
Name of Trolley			
T-shirt	Size (<i>please circle</i>)	Child S M L	Adult S M L XL XXL 3XL
Date of Birth	6-10 <input type="checkbox"/>	11-14 <input type="checkbox"/>	15 - 18 <input type="checkbox"/>
Mobile Contact Number:		Home Contact No:	
Email Address:			
Address House Number Street Suburb			
Suggestions on how we can improve Trolley Derby for drivers and spectators			
Who built the trolley?		How long did it take?	
Interesting features about your trolley. What inspired your design?			
Sponsors? If any		Are you or your parents able to help us on Race Day?	
Single Driver Entry fee included \$30.00 (one form per driver) <input type="checkbox"/>			

Beachlands Maraetai Trolley Derby 2018 Entry Form

Waiver of liability (one form per driver)

I accept the conditions of entry into the Trolley Derby.

I understand that competing in this event contains elements of unavoidable risk and that participation in this event is entirely at my own risk.

I understand that Trolley racing is a risky undertaking.

I have read the rules and regulations for the event on this website (www.logcabin.org.nz) and enter knowing full well the risk and demands included.

I take full responsibility for my own actions during the event and will conduct myself in a sportsmanlike manner.

As such I discharge the event organizers, sponsors and all other persons included in the event from any liability, claims or damages relating to personal injury, loss or damage to equipment, or any other matters arising from the event.

I authorise my name and picture to be used without payment in any capacity relating to the event.

I accept that the organizers can't guarantee that every driver will get equal turns if there are multiple drivers in the same trolley cart.

I understand that whilst the organisers use their best endeavours to generate run times within the limited budget they have, sometimes with IT crashes it doesn't work. The Race Director's decision on placings is full and final\

I will not practice on the full course until after it is set up the day before the big race.

Name of Trolley driver

Signature of Trolley driver

Signature of parent/guardian of a driver 16 years or younger

Date ___/___/___

Beachlands Maraetai Trolley Derby 2018

Rules and Regulations

Categories

The Beachlands Trolley Derby is open to EVERYONE who has read and understood these rules.

Trolleys can be entered in anyone of the following four categories:

6 to 10: The trolley driver is between the ages of 6 and 10 years of age on race day.

11 to 14: The trolley driver is between the ages of 11 and 14 years of age on race day.

15 to 18: The trolley driver is between the ages of 15 and 18 on race day.

Adults: Adults over the age of 18 that love a challenge and are happy to embarrass themselves

Corporate teams are also encouraged to enter in the Adults category only, so if you think you've got what it takes get building now.

Safety Statement

Driver and public safety is our greatest priority. We provide a risk associated sporting event yet work very hard to reduce the likelihood of anyone getting hurt. The following rules continually improve each year. We are now approaching our fifth running of this event. These are tried and tested and ensure enjoyment and safety for drivers and spectators. Please note that there is a waiver to sign for every entry.

Trolley Design Absolute Minimum Requirements

Size:

Width: No more than 1.2m. (To fit on the start ramp)

Length: No more than 2.4m maximum. (To fit on the start ramp)

Body: Must be able to roll on and off a 20 degree slope .Must have an A5 blank space on the back for race number , Drivers name etc. NO EXCEPTIONS.

Weight:

If two average adults cannot lift it onto the trailers to take it to the top, it's not racing. Sorry, heavy carts become unstoppable missiles.

Wheels:

Each trolley must have a minimum of three wheels.

Brakes: (the important bit)

Each trolley must have a braking system that:-

- Acts on at least two wheels and capable of holding the trolley on our starting ramp which is a 20 degree slope.
- Can be applied in a controlled and progressive manner.
- Provide stable and efficient braking without adverse effect on the directional control of the trolley.

- Braking must be able to be operated whilst maintain control of the vehicle.
- No ground anchors.

Steering: (nearly as important as brakes)

- All trolleys are required to have a steering system capable of manoeuvring at speed. You should be able to avoid a trolley in front of you if it crashes.
- Because trolleys with old-fashioned rope steering have proven to be dangerous, no rope steering is allowed. An old lawnmower handle is a useful alternative
- Your feet should not be anywhere near the steering system.

Other:

- Seats must be solidly fixed to the chassis.
- Flare, flamboyance, decoration is encouraged.
- Please no devices that can cause sparks, i.e. fireworks
- No form of power other than gravity.

Roll bars

There was discussion after the 2015 and 2016 events about the need for roll bars. We have discussed this with Manukau Police. Whilst a roll bar is a “nice to have”, the extra effort / tools / degree of building competency etc required to make an appropriately impact proof bar is acknowledged and would preclude some builders from entering. Manukau Police advise us that it is great to see the competitors having fun with managed risk. The decision is yours.

Trolley Design Advice

The following is for guidance only. The Trolley Derby Committee members offer free one on one advice to those in the Beachlands / Maraetai area. Please contact Jenny Carter to get one of the Committee members to contact you.

Wheel Type:

The lighter a wheel is the more acceleration it will have but a wheel must also be strong enough to withstand the forces of steering and braking particularly in bends.

The smaller the area of contact the wheel has with the track, the less drag the ground exerts on the wheel. This is great for acceleration but dire for braking - you see, it is all a compromise.

Wheel bearings play a critical part in the speed of a trolley. Make sure your bearings are clean and use light oil.

Your choice of wheels determines your rolling resistance. This is the amount of resistance your wheels have to the unavoidable pull of gravity that is trying to make your trolley career down the hill.

The perfect trolley wheel is a compromise between weight, strength, contact area, braking performance, rolling efficiency and cost.

Old motor mower wheels are fine but don't usually have bearings.

Pneumatic (air-filled) and solid trolley wheels with bearings can be bought for about \$40 a pair from Bunnings or Mitre 10. We strongly recommend the use of Pneumatic tyres i.e. that is inflatable tyres, with decent bearings on your wheels. Aim for at least an 8 inch diameter wheel -You can run solid rubber tyres however the roughness of the track surface doesn't make for a good ride. Small wheels can often be unstable at high speed and harder to control.

Most bike wheels use a 3/8 inch axle however there are some that use a 1/2 inch axle which tend to be much stronger. If using bike wheels it is recommend to have some sort of support on the outside of them to stop them "tucking in" when cornering or under speed.

Spoke strength also affects the strength of the wheel - BMX wheels are designed for a bit more sideways punishment so tend to have stronger spokes/more spokes, and stronger rims. The larger diameter the wheel the more likely it is to buckle if your trolley is very heavy and/or your spokes or axles are weak. The course has corners, bumps and adverse camber

which also put side load on the wheels. You may be required to take "evasive action" and the axles and spokes may not "handle the Jangle" when asked to turn.

If you want the full Monty and can find some wheelchair wheels, these are very good as they generally have a very strong axle that is self-supporting, they normally have very good bearings, and strong spokes. These are generally quite large so aren't always the best for acceleration however may give you a higher top speed.

Brakes

There are two common braking systems:

Deadman Braking - this is where the brakes are held in the 'brakes on' position by a spring, bungee or bike inner tube. To race, the driver pushes the brake lever and the wheels are released. This is a great system for young drivers as the brakes only stay off while the driver is in control ~ the instant they freak out and move their feet, the trolley slows down.

Active Braking - Cars & bikes use an active braking system.

There are many ways to create rudimentary versions, for example:

- A large piece of car tyre rubber on a lever activated by the driver's foot;
- A hinged lever carrying the foot pressure via a rod to the back wheels.

If you use 10-speed or wheelchair wheels, it will be possible to have brakes on all wheels. If you have a fixed rear axle you can incorporate a bike disc brake.

Steering

Rope steering is not permitted.

Steering should be smooth and without excessive free play. You should limit your steering angle to prevent over-steering which is the primary cause of flipping carts. The more an axle can steer left and right, the likelihood of over steering happens.

Need ideas or stuck for what to do? Google probably provides the best source of info and images for inspiration.

However trolleys have many different names - in the USA Soap box derby racing, in Australia Billy Cart racing, in NZ we've kind of adopted everything, Trolley derby is probably the favourite in NZ however Soapbox, trolley billy cart go kart, gravity racers are all recognised names –

If you want to build a good tried and tested Trolley that was specially design for the Nelson Trolley Club, check out the Formula NZ Trolley Design on the internet. These trolleys make a great first time trolley that is very competitive and relatively easy to build and drive and can be modified over several years as the driver grows in confidence.

Cart Stability

The axle track and wheelbase of your trolley can also majorly affect stability and control at high speed. If a trolley has a long wheelbase and narrow track it is usually very stable but slow to change direction. A short wheelbase and wide track, meanwhile will change direction easily but sometimes too quickly and even when you don't want it to.



Your axle "track" is essentially the width from one wheel to the other. Your wheel base is the distance between your front and rear axles. Generally speaking the wider your "track" the more stable your trolley and the easier it is to steer. If your track is too narrow and wheelbase is short the trolley can flip easily and steering is too jerky. However keep in mind that wider trolleys often have more frontal area so worse aerodynamics and more drag = slower speeds. In widening your track, try and keep the main body of your trolley narrow for optimum aerodynamics.

Centre of Gravity.

The height of your trolley and its centre of gravity can also majorly affect your stability. If you have a high "sitting on top" driver's setup this will increase your centre of gravity and you will require a wider track otherwise you can flip your trolley. The lower your centre of gravity, e.g. the lower the seated driver, the more stable your trolley will be. The Omana course is grassy and bumpy, so too low and you won't clear the bumps in the grass. Trolleys can be as simple as the old soapbox with 4 pram wheels (**but please no rope steering**) or a purpose-designed, 3 wheeler recumbent with an aerodynamic carbon fibre body. 3 Wheelers have less friction and drag so generally go the fastest - Though may not be as stable as 4 wheelers.

Shaping

There are essentially two types of vehicle construction: **Chassis and Body** or **Monocoque**. A chassis and body structure has all strength in the chassis and the skin or body is cosmetic.

In a monocoque design the chassis and body elements are combined to create a more rigid and lighter vehicle. Both systems work well for trolley building as long as the weight and type of material is used not only to maximize performance but also to ensure the safety of the occupant, other drivers and spectators.

For a Monocoque design, 3mm - 5mm plywood makes a great overall skin structure, which can then be filled out with polystyrene, cardboard and brown paper. A design that uses chassis and body construction can really take advantage of lightweight skinning materials.

With the rigid structure taking the weight of the driver and the stresses of the braking and steering systems you can use polystyrene, cardboard, sticky tape, PVA glue and paint to create an elaborate and aerodynamic skin.

Make sure you provide clear lifting points for loading on and off the trucks!!
Ensure any sharp or solid protrusions inside or out are well padded for yours and others safety.
For stability and reduced air drag, position as much of your weight below the axle as possible.
And remember, a light trolley is a fast trolley.

All carts must have an A5 size flat area on the back of the cart for your race number. We learnt in 2017 that if the Race Director and Timekeeper can't see your number, it becomes really hard to tell who is coming next and to get a quickly published time

More Build Tips.

A really great book full of plans and trolley designs that can be found in most libraries is "**The Billy Cart and Trolley Bible**", by Glyn and Jane Bridgewater. It can also be purchased online through Fishpond.co.nz

- For Basic Trolley Design Ideas check out Brian Fangio Smiths suggestions
- Some Basic trolley and kart plans can be found here - kartbuilding.net
- If you're really keen why not try building a trolley size 1932 Ford Sedan - check out the Instructables.com website
- For traditional All American Soapbox Derby carts and plans check out the official website for plans (pretty complex but great tips on steering and brakes in these plans) - AASBD.org

Scrutineering.

- The scrutineer's decision is final.
 - If the scrutineer believes the cart is unsafe or doesn't comply with the basic design guide (in particular for the age and skill of the driver), then the cart will be failed. You will then have till the morning of race day to rectify the issue.
 - All persons driving the cart on race day must attend Scrutineering with their helmet so that we can see that the cart and helmet is matched to the driver.
 - Both trolleys and drivers must be scrutineered before racing commences and if they pass Scrutineering they will receive a sticker. Remember this year we are asking for you to provide a robust flattish area A5 paper size on your trolley so that the sticker stays on.
 - For 2018, Scrutineering will occur at the Beachlands Log Cabin on the Saturday before race day. On Saturday 3rd Feb 2018 (9am to noon), with a potential re-test on Saturday 10th Feb (9am to 10am). There is no parade this year.
 - No local carts will be scrutineered on Race Day 11th Feb 2018
 - If you are from out of town and can only bring your trolley to race day we will be doing Scrutineering on Race Day for you, however if your trolley fails and is unable to be bought up to spec then and there, then you will not be able to race.
 - Expect the scrutineers to push, test, Bounce and generally try to make sure your cart is robust enough for the North Island's only grass track.
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One day only – Practice run

In 2017 we had drivers carrying out practice runs the full length of the track prior to the organizers building the track. The gates were lifted off their hinges and stock escaped. Whilst we realise that it is important to test your cart, we ask that you only test between the two gates. Please respect that Omana is a working farm with livestock in the paddocks and Auckland Council can withdraw our Permit at any time. Our excellent relationship with Auckland Council would be truly tested if gates were opened and livestock escaped or caused an accident.

In 2018, we are offering practice runs on the day before race day the full length of the course from 12 noon to 4pm if the driver and his or her parents have assisted in building the course. Please be advised that there will be no paramedics on site on the day before race day.

Race Day Rules

- Safety first.
- Have fun
- The Race Director and Scrutineers decisions are FINAL.
- Drivers must have forward facing vision at all times during the race.
- Drivers must stay within their starting lanes (traffic cones) for the duration of the cone length.
- We endeavour to ensure all drivers get the same number of goes. This is difficult with multiple drivers in the same cart as the transport up to the start becomes complicated and multiple cart drivers will need to wait. Measures will be put in place to improve this for 2018
- Drivers need to be ready with their carts at all times whilst the racing is in progress.
- There will be a 30 minute stand down period at approximately 12 noon whilst our organizers and volunteers take a well-deserved break.

Absolute minimum protective clothing for each racer is

Headwear:

Children must have head protection which at a minimum must be a close fitting cycle helmet.

Full face helmets are ideal

Adults must have head protection which is to be either a motorbike or BMX helmet.

Clothing:

Enclosed shoes

Long sleeve shirts

Long trousers

Elbow and knee pads are recommended if you have them. (Skateboard / BMX type)

Full finger length gloves.

