13th WONTHAGGI HUMAN POWERED GRAND PRIX

HPV AND PUSHCART RULES BOOKLET

MARCH 19 - 21, 2010

WONTHAGGI, VICTORIA

AIMS

The **2010 *WONTHAGGI* Human Powered Grand Prix** is an exciting program designed to provide opportunities for students, teachers, parents and local industry to work together to design and construct a human powered vehicle.

The program aims to encourage participants to examine and use the latest technology while considering its impact on the environment and the way people live locally and globally. It requires a team effort and an across-the-curriculum approach.

There are many **important changes** to these rules, therefore the rule changes for 2010 are not underlined in this booklet. **Read the booklet fully and check you vehicle's compliance.**

THE 2010 WONTHAGGI HUMAN POWERED GRAND PRIX

- actively involves young people in finding solutions for a world they will inherit
- provides an excellent technology studies project for primary and post-primary students
- is a great opportunity for schools and communities to work and learn together
- provides an opportunity for women and girls to participate in what has traditionally been a male area of curriculum
- will be a fun program with real world challenges
- offers students opportunities to explore and address vehicle design, driving skills and vehicle and passenger safety issues.

THE WONTHAGGI EVENT

Participants in **The 2010 *WONTHAGGI* Human Powered Grand Prix** will gather in Wonthaggi from **FRIDAY March 19th to SUNDAY March 21st** to celebrate their achievements. Activities will include judging of developmental work, displays and endurance trials on a 1.4km street circuit.

THE CATEGORIES

The 2010 *WONTHAGGI* Human Powered Grand Prix has nine separate categories designed to cater for different levels of technology application and understanding. Category 9 has been included to cater for community groups and students from more than one school.

- Pushcarts
  1. Primary Y3-4
  2. Primary Y5-6
  3. Junior Secondary Y7-8

- Human Powered Vehicles
  4. Junior Secondary Y5-7
  5. Middle Secondary Y8-10
  6. Senior Secondary Y11-12
  7. Open Secondary Y7-12
  8. Open Girls Y7-12
  9. Community

CLASSES

- **Students from Year 5 to 7** **Junior**
- **Students from Year 8 to 10** **Middle**
- **Students from Year 11 and 12** **Senior**
- **Open entries for any group of same school students.** **Open**
- **All girls from Year 7 to 12** **Open Girls**
- **Teams of enthusiasts** **Community**

TEAMS

- Junior teams will contest a 16 hour trial with teams of up to 12 riders with a minimum of 4 girls. Students may come from a cluster of Primary and Secondary schools.
- All secondary entries are to be team entries and must consist of current students from the same school.
- Teams in the 24-hour Trial will consist of a minimum of six and a maximum of eight riders. At least half the members of the Middle and Senior class entries must be female. Community teams are free with respect to age and gender.
- All team members must be familiar with the operation of their vehicle entry and must participate in the 24-hour Trial at Wonthaggi.

In the spirit of learning and having fun

PUSHCARTS VEHICLE SPECIFICATIONS

Designing and developing a pushcart can be an enjoyable and productive way of introducing primary students to technology, science and environmental education. The machine, powered solely by students, is based on the old fashioned billycart.

1. REQUIREMENTS

- Teams of eight students will, with assistance if required, design and build a pushcart according to the specifications which follow.
- Each team of eight must include at least four girls.
- The team may obtain the assistance of other students, parents, friends, local tradespeople, community groups etc. in the development of the vehicle. **However, adults are not permitted to assist when the team is presenting to the scrutineers, nor may they "pace" the team during the track events. Teams who are assisted by adults in the delivery of presentations or on the track will be penalised.**

2. DESIGN REQUIREMENTS

2.1 **General**

- The basic design is a billycart with three or four wheels, a roll/push bar and front steering. (The roll bar may be the push bar or they may be separate)
- Any construction material may be used, provided that the safety requirements are met. No car or motorcycle parts are to be used with the exception of seat belts, which are a safety item.
- Every component of the cart in its dismantled state **must be able to fit under an imaginary bar 100 mm high**. The cart can be as high or elaborate as desired providing it can be disassembled to meet this requirement.
- The front of the push cart must have adequate foam or padded protection to prevent injury should the cart collide with another cart, or the feet and legs of another cart's pusher.

2.2 **Brakes**

- A brake must operate on at least one rear wheel. The brake control or pedal must have a definite "off" position, controlled by the rider.
- Moving bolts on the front axle pivot and brake parts must have lock nuts or washers, or be so designed that they don't work loose during the Trial.

2.3 **Wheels**

- Wheels, including tyres, may not exceed 255mm / l0 inches in diameter.
- Front wheels must not contact the cart on full steering lock, causing front wheels to lock.

2.4 **Safety**

- Protruding bolts and fasteners must be cut off and jagged edges filed smooth. **This requirement will be strictly observed at scrutineering.**
- Drivers must be restrained so they cannot fall out of the cart. A proper car seat belt with buckle must be fitted and used by the driver when in the cart. The belt must be wide enough so as not to cause injury **and it must fasten with a buckle. Velcro fastening is not acceptable.**
- The roll bar must provide protection at least 100mm above the head of the tallest driver. It can serve as a push bar or the push bar can be of a separate construction.
- Each member of the team must wear knee and elbow pads, an ASA approved bicycle helmet and protective gloves.

2.5 **Stability**

- If a rear step is installed to enable the pusher to scoot the vehicle, the cart must be stable while the heaviest pusher is standing on the step and the lightest driver is sitting in the cart.

2.6 **Vehicle Identification**

- Each vehicle will require three white identification panels measuring 100 mm x 100 mm for displaying the team's number. These panels must be fitted to each side and the front of the cart. They must be pliable and not constitute a danger to pusher or driver. Numbers will be supplied on registration.
- A 'Tested' sticker will be supplied after the scrutineering 'all clear' has been obtained. This is to be displayed above or below the number at the front of the cart. Provision must be made for this in the front identification panel.
- Provision may need to be made for the display of sponsor panels.

3. ASSEMBLY COMPONENT, DESIGN & CONSTRUCTION

Each pushcart will be presented to the judges in a dismantled state. The team will re-assemble the cart without any help from adults. In the unlikely event of a team taking more than 30 minutes to assemble the cart, the attempt will be abandoned for assessment purposes.

The Design & Construction segment enables the judges to assess teamwork, practical skills and understanding as well as the design features of the vehicle. In this segment, they will be looking for:

- competence at assembly
- innovation in steering and braking
- pushcart presentation
- use of recycled materials
- acknowledgement of sponsors
- involvement in the wider class or school community in designing and constructing the vehicle
- ability to rebuild the pushcart from the dismantled state within 30 minutes

When the judges have assessed the team during the Design & Construction segment, final scrutineering will be carried out (testing of brakes) and, if all is well, the team may proceed to participate in the Trial segment.
Pushcarts <u>may</u> be permitted to compete in the obstacle course, sprint or endurance relay events without a "TESTED" sticker displayed on the vehicle at the organisers discretion.

4. ASSESSMENT

Design and Construction …….....……40 points

The points allocated for each team in the obstacle, sprint and endurance races shall be calculated by dividing your teams time by the fastest teams time and multiplying by the number of points allocated for the section.

Eg. For sprint races ……. $\frac{\text{Your teams time}}{\text{Fastest teams time}}$ % 20 points = your points scored.

Obstacle Course ……...……20 points
Sprint ……... 20 points
Endurance Relay ……..……20 points

5. THE TRIALS

An obstacle course, sprint relay and an endurance relay will test all aspects of vehicle design, construction and reliability as well as student fitness and teamwork.

- The Design & Construction elements and safety requirements must be satisfied before a team can participate in the trials.
- Power for the vehicle must come solely from the single team member who is pushing the cart.
- The pusher may ride on the back of the cart while scooting it along.
- Adequate time will be provided before the trial events start for rectifying any minor problems that might become evident during the Scrutineering and Design & Construction segments.
- Ultimate success on the track will depend as much upon fitness and teamwork as on the design of the cart.
- Poor teamwork, particularly at changeover points in track events, could lead to loss of valuable time.
- Undesirable track behaviour (e.g. arguing at changeover, “pacing” by adults) may be penalised by the marshals.
- All the relay events involve "out and back" trials and are timed over the whole team’s efforts **including changeovers and stops.**
- The obstacle race requires rider/pusher changeovers at each end of the figure 8 and the Sprint race at each end of the course. The Endurance relays involve rider/pusher changeover only at one end.
- Teams will be required to participate in all events. Points will be allocated on the basis of elapsed time in each of the obstacle, sprint and endurance events.
- All relays require each member of the team to ride and push in turn, in pairs.

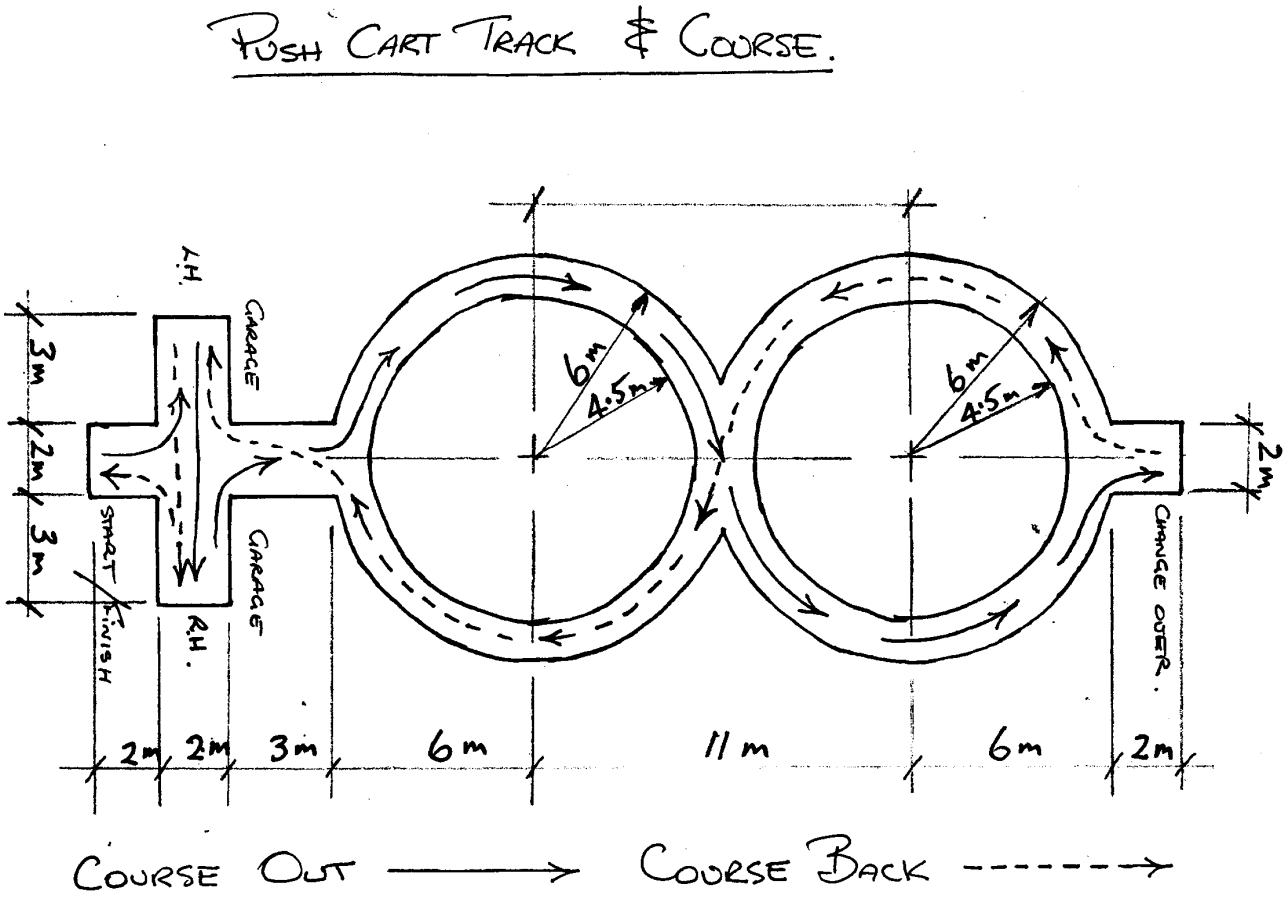
The Obstacle Relay trial shall be over a figure 8 shaped course with a start and 2 garages at one end and a Rider/Pusher change over box at the other.

- All rider changes are to be carried out in the marked change box and seat belts are to remain fastened until the cart has entered the change box.
- Any method of turning the vehicle may be employed as long as the two participants do not leave the change box. Seat belts must be fastened before the cart can leave the change box. Penalties apply to riders/pushers who step outside the box or course marking.
- Directions of travel and change over points are as per the diagram and instructions.
- The team’s time shall be taken from the start of the first rider/pusher combination, until the last combination completes the course.
- Penalties apply for hitting any marker on the course or errors of passage of the course.
- Each penalty point shall add 5 seconds to the overall elapsed time score.

The Sprint Relay component will be conducted over a 50 metre straight track. The team’s time shall be taken from the start of the first rider/pusher combination until the last combination completes the course.

The Endurance Relay component will be conducted over an approximately 150m long grass track. The teams time shall be taken from the start of the first rider/pusher combination until the last combination completes the course.

6. PUSH CART OBSTACLE TRACK



HUMAN POWERED VEHICLE SPECIFICATIONS

Entrants will design, build and compete in a 24Hr endurance event, using a vehicle powered solely by human effort. Design requirements include a maximum length of 2.7 metres, single seat and minimum of three wheels. The rules are similar to those for the RACV ENERGY BREAKTHROUGH, the MAROONDAH GRAND PRIX, the CASEY CARDINIA CYCLING FESTIVAL and the AUSTRALIAN INTERNATIONAL PEDAL PRIX vehicles, to allow vehicles from other events to enter without major structural changes.

Entrants must:

- Design and build a vehicle “from a clean sheet”
- Develop or adapt a vehicle from an existing design
- Liaise with local industry or community groups to design and build a machine.
- Commercially designed vehicles are acceptable, however the spirit of the event encourages school based design and construction.
- The school Principal must sign a declaration indicating the level of involvement in the design and construction by the students.
- Maintain the vehicle in compliance with these regulations through out the entire event.

Vehicles that don't comply fully with these specifications, can be accepted at the organizing committee/scrutineers discretion, except where the breach is in regards to safety.
No vehicle will be allowed to start in the event until it has passed scrutineering.
The organizing committee and or scrutineers reserve the right to stop and inspect any vehicle during the race and assess its compliance to the race regulations. Vehicles that are deemed not complying to the event regulations due to accident, parts removal and/or replacement, cannot return to the track until repaired and inspected by a race scrutineer.

All entrants will be required to participate in a 24-hour endurance trial event (junior 16 hour) on the Wonthaggi Grand Prix circuit through the Wonthaggi Recreational Reserve (including the lights-on period).

1. SCOPE & CONFIGURATION

1.1 INTENT

The human powered vehicle category is intended as an experiment in personal mobility; the objective is to build an efficient and stable machine powered entirely by human effort.

1.2 SEATING CAPACITY, WHEELS

The vehicle shall carry a rider alone, and shall have three or more load bearing wheels arranged in a stable configuration. All wheels on the vehicle must be load bearing when stationary.

1.3 RIDING POSITION

Riding position shall not compromise machine controllability or safety, nor shall the riding position place the rider in a potentially hazardous position in the event of a collision. For these reasons a prone riding position or extreme recumbent position is not allowed. (RACV Energy Breakthrough defines extreme as being less than 20 degrees from the horizontal.)

Note: Any design which places the rider in other than a conventional reclined seating position shall be submitted, prior to the event, to the organisers to gauge compliance with this clause and its intent.

1.4 POWER SOURCE

Motive power shall be entirely supplied by the rider; however innovative systems such as regenerative braking are encouraged. Where regenerative systems are used, adequate shielding and guarding of the energy storage and drive systems shall be used to protect the rider, pit crew and officials from potential hazards.

2. DESIGN AND MATERIALS

2.1 INHERENT SAFETY

- The design shall provide protection for the rider in the event of a collision or rollover.
- The design shall be free of protrusions or other features capable of causing interference or injury to riders, fellow competitors or spectators.
- Where composite materials are used, constructors must ensure Safe Work requirements are met in regard to unbound fibres and sharp protrusions that may endanger riders or pit crew.
- Vehicle control and stability shall not be jeopardised by inappropriate design and construction methods. For example: tilt steered vehicles requiring rider lean have proven unstable in past events. Compliance with this clause may need to be demonstrated.

2.2 CONSTRUCTION

Choice of design and construction materials is free, except that:

- Mounting methods used for composite material or metal safety bars that are demountable from the vehicle frame shall be by means of bolts and anchor plates. Each end of the bar shall be mounted to the main frame with a minium of 2 x 6mm dia grade 5 bolts, through anchor plates with their mount to the frame holes within 30mm of the bar and minimum spacing 30mm. For composite material bars, anchor plates must be glued and sandwich the bar structure or be cast into the structure as part of the composite.
- Where safety bars are mounted to composite material chassis, a backing plate 30mm diameter (minium area) shall be on the opposite side of each bolt to spread the load and prevent tear out.
- Construction methods shall produce a sound, race-worthy vehicle that presents no dangers to rider, other competitors or pit crew.
- The use of bicycle forks and frames is not permitted, but bicycle centre brackets, head stems and wheel dropouts are allowed provided the length of adjacent original frame tubing does not exceed 30mm.

2.3 BODYWORK

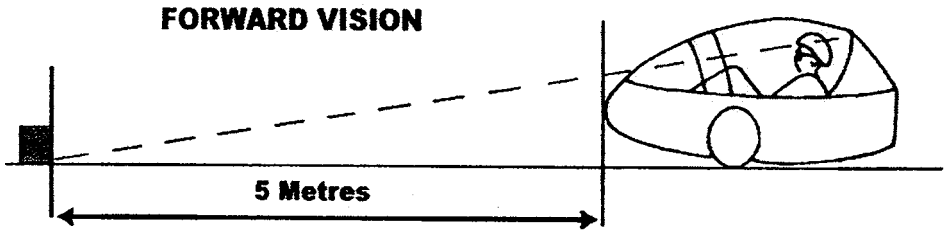
Full or partially enclosed bodywork is encouraged. Where full bodywork is fitted:

- There must be a forward distance of at least 300mm between the rider's face and any bodywork or screen. Open cockpit and screen edges must be taped or have rolled edges to prevent cuts.
- The rider shall be able to open and/or remove bodywork and exit the vehicle without external assistance in less than 7 seconds.
- Bodywork shall be capable of being opened and/or removed from outside the vehicle, independent of the rider, in an emergency.
- Rider and vehicle safety shall not be impaired by restricted ventilation or visibility.

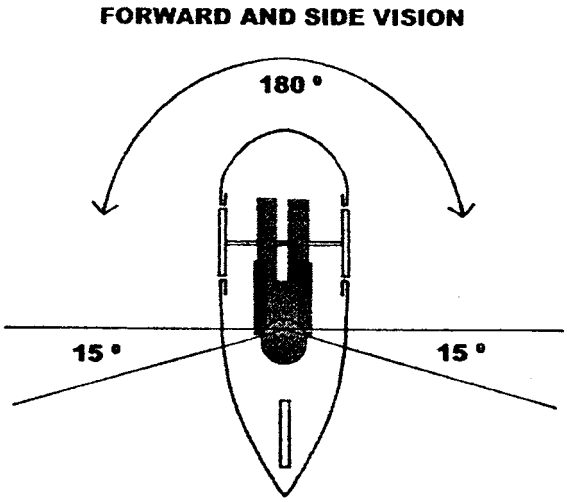
2.5 RIDER VISION

Riders seated in the normal riding position must be able to meet the following vision requirements.

- Sight an object on the road at a distance of 5 metres in front of the vehicle.



- Sight 180 degrees ahead of the rider and any other vehicles 15 degrees behind the rider on each side by turning their head.



- Provision should be provided to reduce the effects of rain and fogging.

3. DIMENSIONS

The vehicle shall comply with the following major dimensional requirements.

3.1 Length	2700 mm maximum
3.2 Width	1100 mm maximum
3.3 Height	1200 mm maximum
3.4 Wheelbase	1000 mm minimum between the most forward and most rearward axles
3.5 Track	600mm minimum lateral distance between outermost wheels measured at ground level
3.6 Turning circle	10 metre diameter maximum between kerbs in either direction

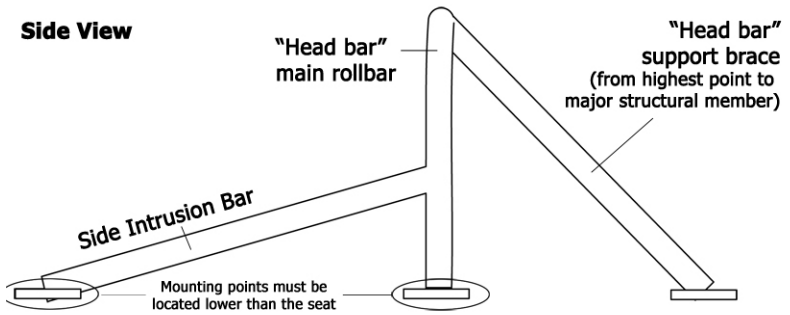
4. OCCUPANT PROTECTION

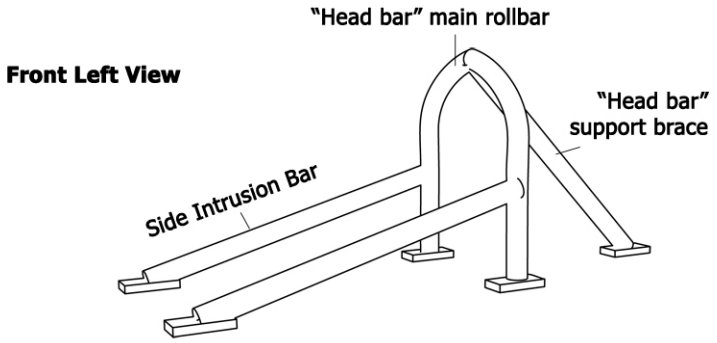
4.1 ROLL OVER PROTECTION

Three protection bars shall be fitted to any vehicle. A head bar, leg bar and side intrusion protection. All shall comply with the following requirements.
These protection bars must be able to support the weight of the vehicle and protect the rider in a roll over or “T bone” situation.

Head Roll bar Construction

- The head roll bar configuration shall be a hoop of one continuous length with any exposed corners having a minium radius of 50mm and mount to the frame below the seat line.
- The head roll bar shall be made integral with the vehicle frame (or monocoque chassis) by means of welding, bolting (Gr5 Min) or by permanent high strength fastening devices. Guillotine locks, Dzus fasteners, Clevis pins, Split pins, Self tapping screws etc do not fulfil this requirement.
- Where composite material bars are used with a composite chassis, the joins may be one continuous piece without the use of anchor plates.
- Where metal tube head bars are mounted onto composite monocoque chassis, mounting shall meet dot point 2 in *Rule 2.2 Construction*.
- The head roll bar shall be longitudinally braced from its highest point to a major chassis point, forming a triangulated structure between head bar and brace of no less than 10 degrees when viewed from the side.





Dimensions

With the tallest competing occupant in normal riding position, the head roll bar shall envelop the rider silhouette when viewed from either front or rear and shall conform to the following dimensions:

- height above helmet 150mm minimum
- width at top of helmet 400mm minimum
- width at shoulder level 500mm minimum
- the roll bar shall be positioned no more than 150mm forward or rearward of the rider's helmet
- there shall be a minimum of 50mm clearance between any part of the rider at the highest point of pedalling action and a straight line drawn from the top of the main hoop to the top of the leg bar, extending forward over the foot area.

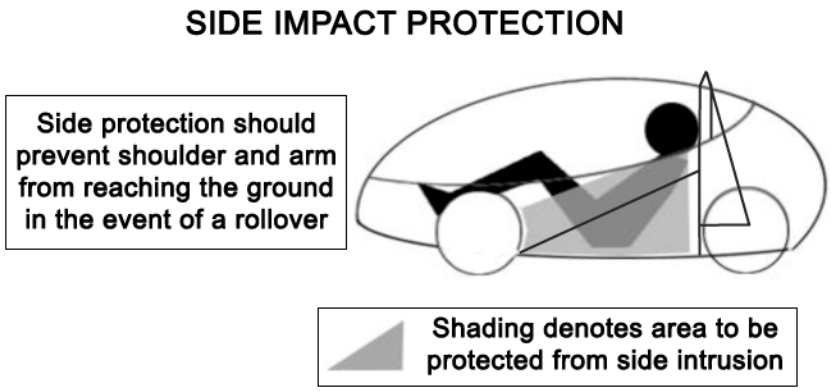
4.1.2 Leg Roll bar Construction

- The leg bar shall be constructed transversely across the vehicle so that the rider's legs, knees and feet are protected from being crushed when the vehicle is in the upside down position.
- The leg bar must be braced to prevent the bar folding over in the event of a roll over or collision.

4.1.3 Side intrusion protection

The vehicle design must provide side intrusion protection for the rider, either in the form of intrusion bars or framework and have a 50mm clearance around the rider.

- The intrusion protection must be firmly attached to the head roll bar by welding or bolts (Gr5 Min.) and be firmly attached at the bottom forward end to the frame or substantial brackets attached to the frame.
- Strong body panels that will protect the rider must be fastened outside the intrusion bars or framework. This panel is to shield the area between the rider's hip and shoulder from direct contact with the road surface, safety barriers or another vehicle. Coreflute plastic meets this requirement.

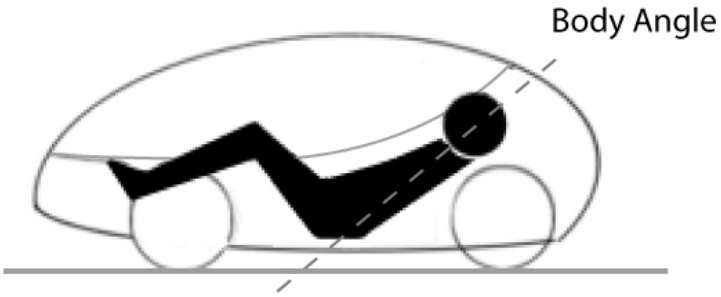


- It is encouraged that these panels be part of a bodywork shell.
- No part of the rider shall be allowed to protrude outside the side protection in the normal operation of the vehicle.

4.2 SEAT

4.2.1 Position

Seat design shall not compromise machine controllability or safety, nor shall the seat place the rider in a potentially hazardous position in the event of a collision. For these reasons a prone riding position or extreme recumbent position is not allowed. (RACV defines extreme as being less than 20 degrees from the horizontal.)



4.2.2 Locking

The seat must be locked into position. Adjustable seats must lock securely into position for each rider and not be able to be moved while the rider is seated.

4.2.3 Extra padding

Any temporary or removable seat padding used by the riders must be fixed into place using a positive attachment to a fixed part of the vehicle or seat frame. Straps, Ties, Cord loops, Velcro, Clips etc meet this requirement

4.3 SEAT BELT

4.3.1 Type

The vehicle shall be fitted with an adult four point automotive static seat belt.
Automotive full harness types are acceptable.

The seat belt will include a standard automotive buckle.
Second-hand belts free of visible damage are acceptable.
Seat belts to be at least 50mm wide and adequately attached to the frame by the standard terminal stitching of a commercially made seat belt.

Recommended suppliers

HEMCO INDUSTRIES Vic.
Phone (03) 5334 1213
Fax (03) 5334 1011

KLIPPAN SAFETY PRODUCTS
Phone 1800 804 588

4.3.2 Mounting

The seat belt shall be mounted to a major structural member of the vehicle **in such a way that the belt is positioned to satisfy ADR 4/01.**
Upper belts may be mounted to suitably braced points on the roll bar **but must not pull excessively downwards on the rider's shoulders while restraining the rider.**

4.3.3 Positioning

The positioning of buckles and belts on the rider's body shall conform strictly to the belt wearing requirements of Australian Design Rules (ADR's) for motor vehicles.

The relevant section of the ADR 4/01 is reproduced below.
"Seat belts are designed to bear upon the bony structure of the body, and should be worn across the chest, shoulders and low across the front of the pelvis; wearing the lap section of the belt across the abdominal area must be avoided.
Seat belts should be adjusted as firmly as possible, consistent with comfort, to provide the protection for which they have been designed. A slack belt will greatly reduce the protection afforded to the wearer."

4.4 SHIELDING

4.4.1Rider Protection

Wheel spokes shall be shielded **on both sides** with rigid material to prevent injury resulting from accidental contact with rider's limbs or fingers. **This applies to both external and enclosed wheels**.
Other moving components (chains, sprockets, gear wheels and controls) shall be guarded to prevent accidental hazardous contact with rider or clothing and have "pinch points" shielded.

4.4.2Protection of other Vehicles

Chains, gear wheels and sprockets shall be suitably shielded to prevent their contact with other vehicles.

4.4.3 Shielding from Road Surface

Vehicles must be fitted with an under-tray or floor panel which prevents the riders feet, legs or hands from contacting the road surface when seated in the riding position. It is encouraged that the tray/floor be part of a body shell.

4.5 SAFETY EQUIPMENT

4.5.1 Helmets

Riders shall wear a properly fitted and adjusted approved bicycle helmet **complying with ASA 2063** or the appropriate European Standard, at all times when riding the vehicle.

4.5.2. Gloves

To protect the riders from gravel rash or friction burns riding gloves shall be worn at all times when riding the vehicle.

4.5.3 Glasses

In open top vehicles riders shall at all times, wear glasses that adequately protect their eyes from foreign matter. Where the front screen is removed from an enclosed body the rider shall wear eye protection.

4.5.4 Clothing

Clothing should be firmly fitting and, preferably, cover the rider from elbows to knees. Singlets and tank tops are not permitted.

5. STEERING

5.1 TYPE

The type of steering mechanism is free, provided the driver is afforded continuous positive control without the need for regular adjustment. Simple rope systems are not permitted.
Steering columns that project towards the rider's face must not be closer than 300mm from the rider's face.

5.2 FREEDOM FROM BINDING AND FOULING

Steering linkages shall operate freely from full left to full right lock without binding or fouling.

5.3 LOCK STOPS

Positive stops shall be provided to limit the steering linkage movement at maximum lock to prevent damage, over centre travel, or tyre or wheel contact against occupants or frame components.
Stop bolts, plates, chains or cables are acceptable for this requirement.

6. BRAKES

6.1 INDEPENDENT SYSTEMS

The vehicle shall be fitted with a minimum of two effective independent braking systems acting on one or more wheels. All wheels in contact with the ground must have a braking capability.

6.2 DIRECTIONAL STABILITY

Independent operation of any braking system shall not have the potential to affect directional stability of the vehicle. That is, the braking power of each and every braking system shall be symmetrical about the vehicles longitudinal centre line.

6.3 SIMULTANEOUS OPERATION

A minimum of any two braking systems shall be operable by the rider simultaneously.

6.4 STEERING CONTROL

Full steering control shall be maintained while any two braking systems are being operated.

7. ANCILLARY DEVICES

7.1 LIGHTING

The track will be lit with normal street lighting supplemented, where possible, with some additional lighting. Therefore the vehicles lighting shall meet the requirements of **rule 7.1** and **Appendix 1**:
7.1.1 Headlight
Each vehicle shall have a minimum of one white headlight.

- The headlight shall provide sufficient light for the unlit areas of the track and be fitted at least 350mm and not more than 600mm above road level at the front of the vehicle.
- Note. Clear covering panels over all light types, especially those at acute angles, severely reduce the lux density of the light and may cause non compliance with the required light output.

7.1.2 Tail Light

Each vehicle shall have a minimum of one red tail light, minimum total lens area 7cm^2.

- Bicycle, red flashing LED-type tail lights are acceptable when set to "3 leds on" sequence, at one time.
- The tail light shall be positioned symmetrically about the vertical axis of the vehicle, at least 450mm and not more than 600mm above the road level.

7.1.3 Outline Lighting

The use of reflective material or strip lighting to indicate machine width and height (especially from the rear) is encouraged.

7.1.4 Mounting and Aiming

All lights shall be securely mounted to maintain correct aim.

7.1.5 Batteries

All batteries used in the vehicle shall be suitably restrained, method dependent on size and weight. Lighting batteries shall not be able to spill or fall out of their restraint if the vehicle is inverted.

7.1.6 Operation

Both head and tail lights must be securely mounted and continuously operational during the designated "lights on" period. This will approximate to the streets lights being lit. Teams will be advised when lights must be turned on and when they may be turned off.

7.2 MIRRORS

7.2.1 Number and Type

The Vehicle shall be fitted with two flat plain or mildly convex mirrors, one on either side of the rider. The two mirror lenses shall have similar curvature (i.e. same image size).

7.2.2 Positioning

Each mirror shall be positioned no lower than rider chest height and such that:

- the rider is afforded a clear view to the rear
- the rider can reach and adjust each mirror from the normal riding position

7.2.3. Size

Reflecting surface area of each mirror shall be 40cm^2 minimum.

7.2.4 Mounting

Mirrors shall be securely mounted to non moving chassis/body members and be free from vibration.

7.3 WARNING DEVICE

An audible electrical warning device shall be fitted and operable from the normal riding position, and shall not impair rider control in its mounting or use and the mouth of which must be licked by the external air stream.

The rider may be required to demonstrate the operation of the horn at pit exit.

The operation of the horn must be solely by the use of a momentary switch.

The horn must emit sound in excess of **85** dbA measured directly in front of the vehicle at a distance of 1 metre. This will be checked at scrutineering.

7.4 OTHER DEVICES

Other equipment e.g. drink bottle shall be securely mounted, and shall not impair rider control in its mounting or use.

7.5 SPEEDOMETER

It is compulsory that the vehicle be equipped with a simple electronic speedometer (eg cateye) to monitor speed whilst in the pit areas (speed limit of 15kph)

8. MARKINGS

8.1 NUMBER AND COLOUR

Each vehicle shall have three identification panels, so that the vehicle number is clearly visible from the front and either side. The front number must be on a body panel that is at an angle of not more than 45^{o} to the vertical.
Identification panels shall be either a rectangle 250 x 300mm or a circle 280mm diameter.
Panels shall be coloured according to the class entered and surrounded by a black border 18mm wide (insulation tape).

Junior	- Orange
Middle	- **Pale** Green
Senior	- Yellow
Open	- White
Community	- **Pale** Blue

No marking or design is permitted within 50mm of the panel, or within 50mm of the border.
Official numbers will be supplied by the organisers at the time of registration and must be properly affixed to the vehicle prior to scrutineering.

8.2 EVENT SPONSORSHIP

Vehicles shall have provision for placement of event sponsorship stickers that must be clearly visible at all times throughout the event.
Each vehicle shall have one space on each side of the vehicle measuring 600mm by 300mm for this purpose.

8.3 TEAM SPONSORSHIP

Teams are invited to display on their vehicles and uniforms, any signs/logos that promote healthy school/institution, industry and community links.
Signs/logos, stickers, vehicle name etc. representing drug, alcohol, illegal substances or practices are forbidden.
The event organisers, in the public's interest, reserve the right to request removal of any offensive signage or refuse participation in the event by a team member, team or vehicle.

9. TIMING

The organisers utilise an automatic timing system that requires all vehicles to be fitted with a timing transponder. Fully charged transponders will be available from the official timekeepers and must be securely mounted in the vehicles at all times during practice and racing.
Mounting instructions, if required, will be supplied with any further regulations.

The Timerkeepers for the event shall be Multisport Australia.

☎: + 61 2 97742148
: + 61 2 97741064
: + 61 411 029675

W : www.multisportaustralia.com.au
: info@multisportaustralia.com.au
: cc_nsw@hotmail.com

: PO Box 4228 , Lugarno, NSW, 2110, Australia

Appendix 1 - *Lighting and testing Methods*

The head light fitted to Human Powered Vehicles for the Wonthaggi Human Powered Grand Prix, shall have an equivalent of 20 watts rated power, (preferably 25w) aimed to illuminate the roadway ahead.

- The headlight shall comprise a parabolic reflector and a light source, emitting a range of frequencies with an output in excess of 14500 lux. In the case of multiple headlights at least one light must have an output in excess of 9000 lux but may not be used in a system where only one light is selectable to a lower lux value than 14500 lux.
- The light must be capable of producing a visible light spot on the road surface. This spot must not exceed 40cm wide when measured 1 metre in front of the headlight.
- The output of the headlights will be tested using a standard Lux meter available from a secondary school science department with the sensor being placed at one end of a 100mm diameter, white (stormwater) PVC pipe, 600mm long and the light at the other end.
- Bicycle HID lights and 12v20w halogen down lights both meet this requirement.
- Most commercial LED type headlights currently do not comply with these requirements. If you intend to use high performance LED head lighting, “Check Carefully” the lux output before scrutineering,

The following is a list of commercially available lights that meet the requirements for the Wonthaggi Human Powered Grand Prix when mounted correctly without any form of transparent covering.

12V 20W 16^{o} Downlight powered by a 12V 7Ah sealed Lead Acid batteries.

12V 20W 32^{o} Downlight powered by a 12V 7Ah sealed Lead Acid batteries.

Cygolite Dual Cross Lithium ion

Cygolite Dual Cross 300 LED

Cygolite Trion 600 LED

Cygolite Dual Cross Pro

Ay Up Twin Cree X lamp

Lumicycle Halide 2009 Plus

Nite Rider Slick Rock 900

Jaycar Rechargeable 35W HID spotlight

LUXHID Maglevin HID 24W

Topeak Moonshine 3H with Lithium Ion battery

Topeak Moonshine Enduro HID

Most High Intensity Discharge (HID) models meet the basic requirements as listed above.

This list is not exhaustive and can be up dated at any time.
Competitors should be aware that many of the lamps listed above are expensive and it is the responsibility of the entrant to ensure that the headlights fitted to their vehicles comply with the current rules.

ENTRY FORM

Tax Invoice ABN 45 454 918 270

March 19th, 20th, 21st, 2010

Category & Event	Team/Class	Cost
Pushcart (Obstacle, Sprint, Endurance) (Indicate the class/age group in the appropriate box)	**Middle Primary** Yr 3-4 ☐ **Senior Primary** Yr 5-6 ☐ **Junior Secondary** Yr 7-8 ☐	**$40** (inc. GST)
Human Powered Vehicle (Scrutineering/24 hour Endurance) (Indicate the class/age group in the appropriate box)	**Junior Secondary** Yr 5-7 ☐ **Middle Secondary** Yr 8-10 ☐ **Senior Secondary** Yr 11-12 ☐ **Open Secondary** Yr 7-12 ☐ **Open Girls** Yr 7-12 ☐ **Community** ☐	**$200** (inc. GST)

School/Entrant: …….

Address: ……..

……Postcode ……...

Phone: ……. Fax: …….

Team Name: ……

Enclosed is a cheque for $ …… Made payable to *Wonthaggi Energy Innovation Festival*

Contact Person ……..……Signature:……...
(please print)

Principal's Signature: …….

Indicate size of marquee if required. 3x3 ☐ 6x3 ☐ 6x6 ☐

Marquee prices; 3x3, $160, 6x3, $260 and 6x6, $510. Marquee cancellation shall be no later than 3 weeks prior to the event or full payment will be required.

Please don't forget to…

Use a separate form for each team entry
Forward entry forms and payment to:

The Race Secretary
2010 Wonthaggi Human Powered Grand Prix
10 Henry Street West
North Wonthaggi 3995
Victoria

Phone (03) 5672 2570

Web site: http://www.wonthaggisc.vic.edu.au/hpv

Please indicate on the entry form if you wish to hire a marquee on a "walk in walk out" basis. Marquees are 3x3m or 3x6m in pit lane or 6x6m in the camping area.

Closing date for entries

Friday 20th February 2010
For Pushcarts and Human Powered Vehicles

The first 80 entries in the HPV section will be accepted. Subsequent entries shall be placed on a waiting list.

All entries are accepted at the organiser's sole discretion.

Contact Numbers

Race organisers
Ewan Cole (Race Secretary)
Phone **(03) 5672 2570**
Mobile **0428 348 345**
e-mail **ewancole@bigpond.com**

Allan Harris
Phone **(03) 5672 1344**
(03) 5678 7394 ah
Fax **(03) 5672 1578**

Website **http://www.wonthaggisc.vic.edu.au/hpv**

Vehicle Specification

Allan Harris
Work ☎ (03) 5672 1344
Home ☎ (03) 5678 7394

Fax (03) 5672 1578

EMERGENCY PHONE NUMBERS

Police	5672 2761
Ambulance	000
Fire Brigade	000
Wonthaggi Medical Group	5672 1333
Wonthaggi Hospital	5671 3333