SHWEEB
MONORAIL
TECHNOLOGY

YOUR SPACE, YOUR TIME, YOUR POWER

TECHNOLOGY

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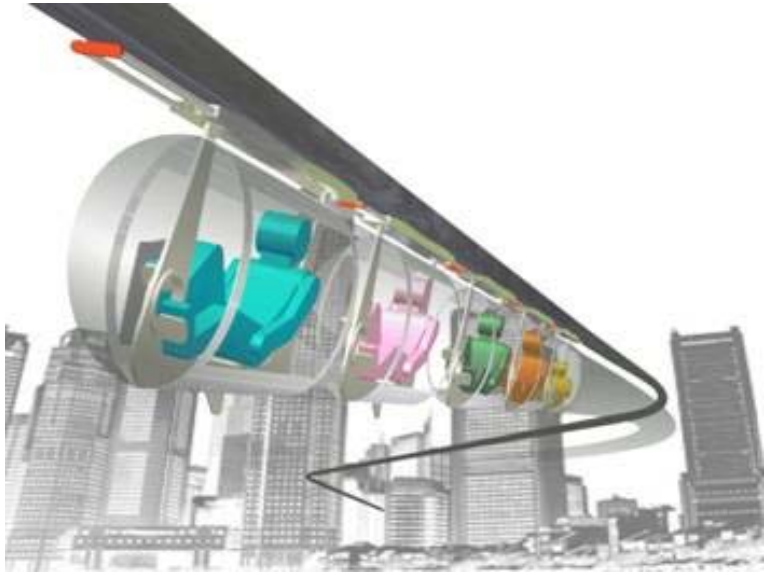


Aerodynamics and Efficiency

There are two ways a vehicle can attain speed. One is to fit the vehicle with a bigger engine to burn more fuel. The other is to reduce the resistances acting against the vehicle. The Shweeb proves that by intelligently removing resistances, the energy required to move a vehicle becomes very small. So small in fact that it becomes possible to dispense with the mechanical engine and utilise the organic engine that the human passenger already carries - muscle power.

The three main resistances acting against any moving vehicle are aerodynamic drag, rolling resistance, and transmission losses. At high speeds, aerodynamic drag is by far the greatest. Around 80% of a cyclist's energy is used to overcome wind resistance. By placing the rider feet forward, recumbent cycles halve the amount of wind resistance. Adding a fairing allows it to slip through the air even more cleanly. All world cycling records are held by fully-faired recumbent cycles, which have been ridden at speeds over 90kph (56mph).

Furthermore, by running hard wheels on hard rail, the Shweeb greatly reduces rolling resistance. Its specialised transmission system transfers power from the pedal to the rail with minimal friction losses.

The Shweeb requires less energy to cover a given distance than any other vehicle on earth.

On top of this, Shweebs travelling in *trains* are even more efficient. The leading pod pushes the air out of the way, allowing the following riders to combine their strength and push the leading rider forward at a speed beyond that which any rider could manage individually. The single high pressure zone at the front is effectively shared over the total number of riders in the train.

Towers and Spans

The Shweeb glides through the city on sleek ultra-thin rails measuring only 200mm x 200mm (8 inches) and spanning 20m (66ft). These are set 6m (19ft) above ground level to clear traffic and pedestrians. They can be styled and coloured to suit with the surroundings.

The Network

Our vision is a gradually expanding Shweeb transit network that would ultimately connect high density residential areas with central business and employment zones.

On a typical day, you would get up in the morning and descend to the second level of your residential tower, where there is a Shweeb station and ample pods waiting for you. You would get into the capsule, park your luggage and hang up your jacket. You'd then ride to work at a leisurely pace over the top of the traffic jams – not even raising a sweat. You wouldn't have to worry about finding a car park space or paying for parking. You'd arrive at work feeling fit, healthy and ready to go!

Stations and Stocking

Our vision is a gradually expanding Shweeb transit network that would ultimately connect high density residential areas with central business and employment zones.

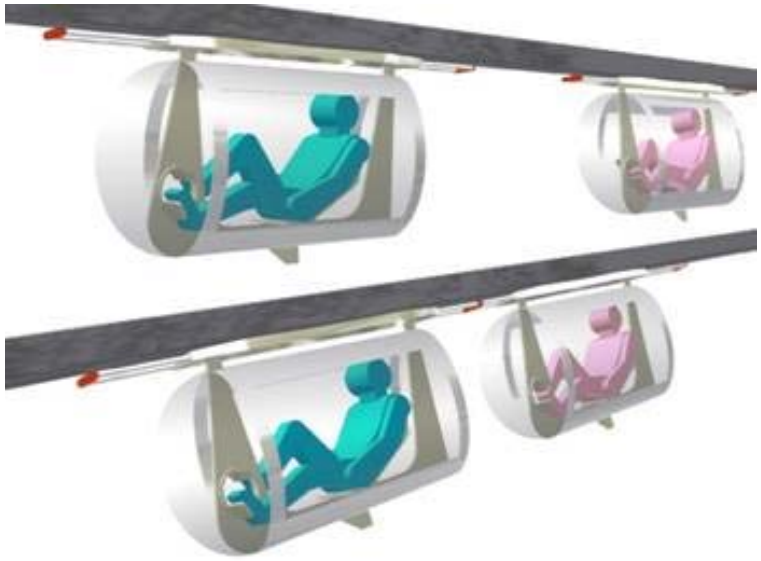
The station, in its simplest form, is a sheltered platform where riders can get on and off the pods. Empty pods are sanitised and rotated on a storage track. The supply of pods is carefully managed to serve the customers' movements. In the morning rush hour, as commuters migrate from their residential towers to the central business district, the supply of spare pods at residential stations is depleted while at the downtown end, a surplus forms. To maintain a balanced supply, the network staff transport the empty pods back to the residential areas. This is possible because a single staff member can move multiple pods. In the evening the flow reverses.

The station measures only the size of five standard car parking spaces yet has the capacity to release 360 commuters an hour onto the main line.

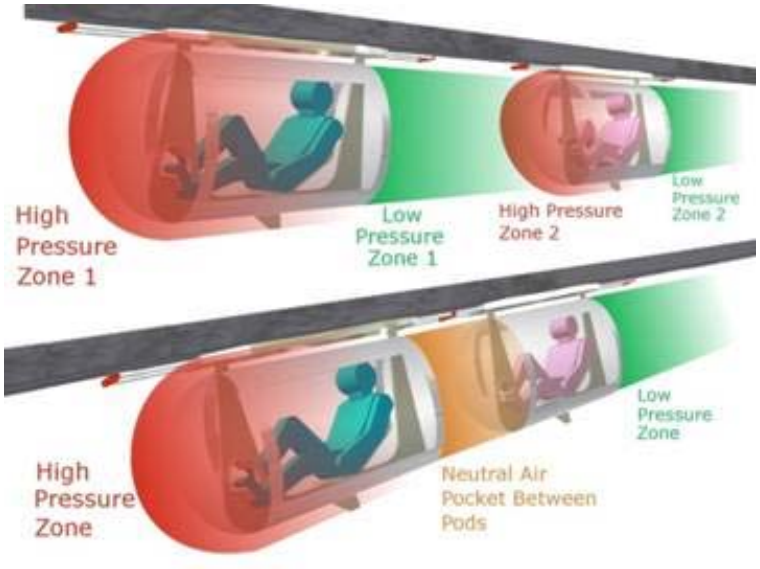
Vehicle Variations

The standard commuter pod has space for a backpack/briefcase and a coat hanger for your jacket. A child seat can be inserted too. If there are two of you, double pods are available.

Buffers and Trains



Shock absorbers protruding from the front and the back of each vehicle supply a 1200mm (4ft) buffer zone between vehicles. This allows vehicles to come together at speed differences between 0-30kph (19mph) without harsh jolting. Shweeb transit pods are geared to move at 5 – 25kph (3 – 16mph).



There is no need for an overtaking lane. When two riders come together, the dynamics change completely. Riders travelling separately are held back by the high pressure zone (the 'headwind') pushing against their nose, and the low pressure zone (the vacuum) pulling on their tail. When vehicles come together, these resistances are halved. The front rider loses their vacuum and the rear rider loses their headwind. In effect they become one vehicle with two engines. The front rider simply changes up a gear to compensate for the higher speed.

Just as tandem bicycles always travel faster than two single bicycles, two Shweebs travelling in a train always travel faster than either of them could travelling solo.

It is for this reason that the bullet shape is most efficient. Although an aerofoil ('teardrop') shape would be faster for a solo rider, its reduction of tail vacuum makes it less effective as a train segment.

Elevation

Not all cities are flat. In locations where a Shweeb rail has to make a substantial climb upwards, a conveyor chain under the rail would lift the pods up the hill. This could be powered by solar panels on top of the rails and activated only when pods are travelling too slowly to clear the rise with their own momentum. Shweebs travelling faster than the speed of the chain would fly over it without being slowed.

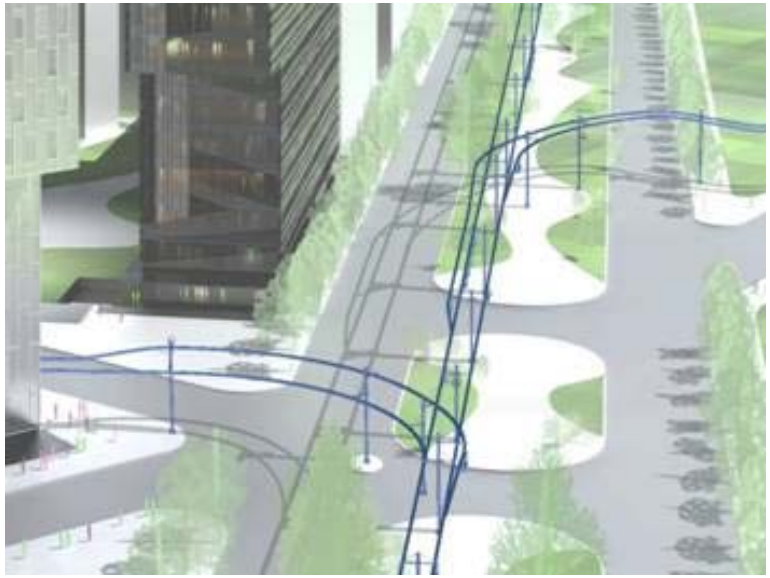
Terminus Station

This is more an *energy storage system* than a *station*. It converts kinetic energy (forward motion) into potential energy by ramping the incoming pods up two meters (6ft) into the platform area so that they come to a natural stop. A back up escalator (see 'Elevation' section above) assists riders who have slowed. Disembarking riders roll down into the mainline - thereby getting a gravity kick start. Each rider is effectively passing on the energy required to start a Shweeb to the next rider, so the only power requirement is that of maintaining the momentum.

Off line Station

Stations positioned along a trunk line do not hold up Shweebs travelling along the route. The mainline carries on in a straight line under the station. Riders who want to get off at that stop switch off the main line and ascend an off- ramp. Disembarking riders are naturally accelerated onto the main line when it is clear and safe to do so.

Switches



Riders can travel anywhere on the network without having to stop at a station to change lines. Shweebs can merge off and on lines at high speed. There are three mechanisms in play here. (1) A rider-activated in-pod lever alters the pod's tracking wheels to move it off the current line even if it is travelling within a high speed train. Pods that want to merge onto another line ascend a conveyor (2) to a higher position so that as soon as the main line is clear, a gate (3) releases the pod and gravity accelerates it to the speed of the new line.

Bridges and Suspension Spans

Cables are a more effective way to span longer distances. The ‘dead load’ of a road bridge is many times greater than the live load. A car travelling over a bridge only uses a fraction of the surface area of the bridge, but the lane must be three meters wide and able to carry heavy loads on any part of it. On a Shweeb bridge there is very little dead weight because the pods follow a predictable track and weigh a set amount. The 200mm wide rail weighs less than the pods travelling along it.

Sustainability

The Shweeb is a zero-emission transportation system. Because it is so easy to pedal, the rider will not even emit much more carbon dioxide than he/she would if using a more passive transportation mode!

Shweeb rail is designed to last 50-100 years. At the end of its life, it can be smelted down and reused.

The Shweeb network makes use of the airspace above existing rights-of-way and has almost no presence at ground level. This frees up the ground area for more economically and ecologically valuable uses like promenades, markets and parkland.

Last century the human body was viewed as a piece of cargo that had to be carted, immobile, to its destination. This view is quickly changing. A sedentary lifestyle is now understood to engender a host of problems (obesity, heart disease, etc). Opportunities to exercise are harder to attain, leisure time is shrinking, and open space is diminishing. Thus the Shweeb adds value to your commute by giving you mobility and fitness simultaneously.