

Development plan for Hyperloop wheels

A good start - the 1,000 km/h tire

The wheel on the right is the pneumatic tire used by the Blue Flame rocket car in 1970. Driven by Gaby Gabelich it achieved 1014 km/h (634 mph), on the unprepared surface of Bonneville salt lake.

The wheels and tires for these speed records were supplied by Goodyear. They were quite reliable, one tire did all 25 runs. Polyester (Nylon) fibres were used for the structure, modern fibres such as Kevlar, PBO and carbon are 5-10 times stronger.

Goodyear could build a similar tire, using modern materials, which could run at Hyperloop speeds. The R&D project would then develop the tire to achieve acceptable reliability and durability. Or maybe develop a completely different type of resilient wheel.



Technology advances with high-speed wheels testing

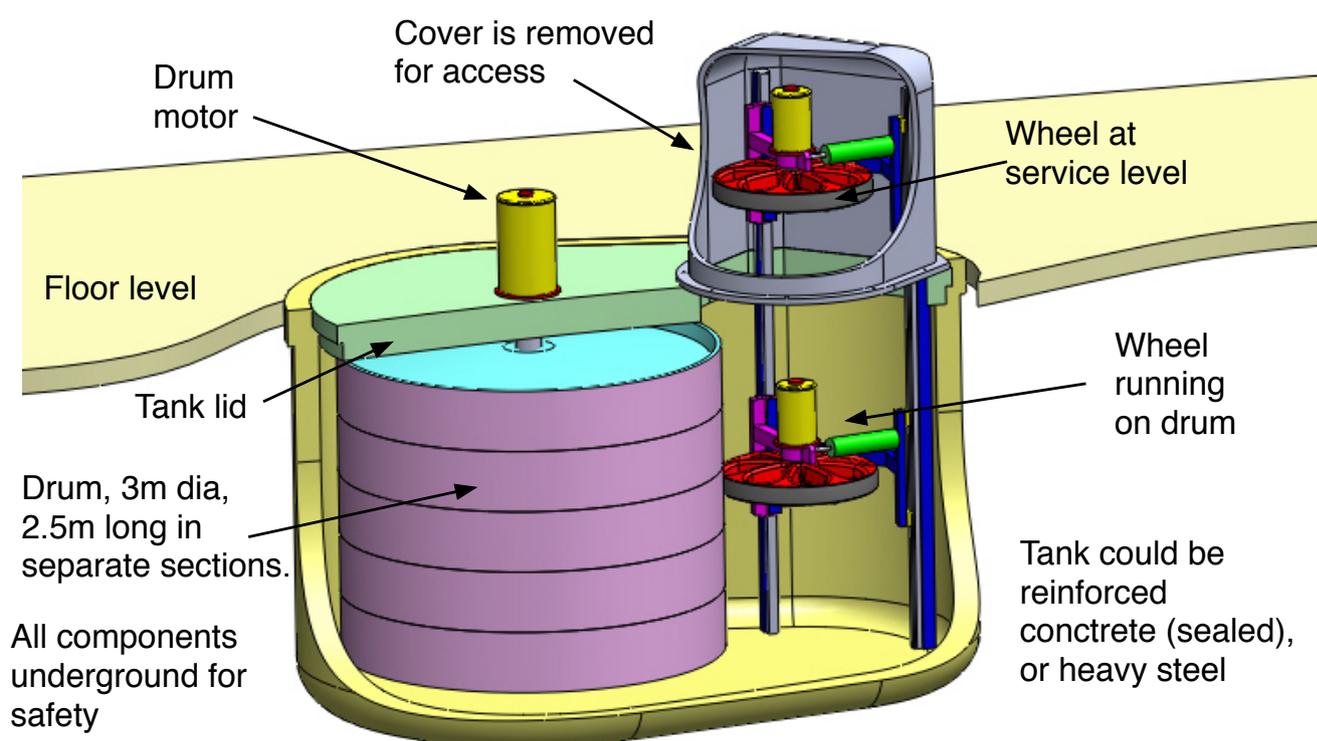
Wheel development has stalled in the last few decades, because wheels perform as required. The speed of sound is a hard limit to land speed records, so the maximum speed for wheels has not increase for 45 years, despite the advances in modern materials.

Road and railway speeds are limited by other factors, so there has been no need to increase their speed potential.

Rolling road test rig for wheel research

This rolling road test rig is an important stage in the validation of Hyperloop. It can run at the full 1,200 km/h with the design vacuum. It is a large vacuum chamber, with a motor-driven drum. It can test:-

- pneumatic wheels,
- steel rims on soft surface,
- maglev.



Flexibility

Hyperloop research needs to be very flexible, there will be many surprises, twists and turns in the development. So this rig can be used to test a variety of wheel types, and possibly maglev.

Size

The drum size is 2.5 m (8 ft) diameter, 2.5 m long. This large size is necessary to withstand the rotational forces (2,500 rpm) with composite or aluminium. Also to give a realistic contact area for the wheel.

Wheels

The wheel is mounted on a track, so that it can use the whole surface of the drum. If a metal wheel is used, the tube may need to be lined with a material like polyurethane, which would only be contacted every 30 seconds and will not heat up. With the test rig, the wheel can be moved along the drum to reduce overheating.

Cooling

Cooling is an important issue for Hyperloop, due to the low conductivity of the near-vacuum. The compressor, motors, and the turbulent air need to be cooled, this test rig can be used to find the best method.

Safety

The possibility exists for a wheel explosion causing a more serious drum failure. The axis of the drum is vertical, and the whole assembly is underground to contain parts breaking out of the tank.

