



The Langen Suspended Railway over the River Wupper. http://www.nycsubway.org/wiki/Wuppertal,_Germany

The Challenge

Using your LEGO set, motor and battery box, your team will design and build a suspended monorail system that can transport objects to different locations. You will need to consider power, speed and balance in order for your system to move safely.

Specifications:

- The monorail system must be powered by one motor and one battery box, controlling all functions of the system, unless otherwise stated. The battery box must be mounted to the chassis.
- The monorail must be designed to attach to the provided overhead track.
- Teams will manually connect their system to the provided track.
- Teams must demonstrate that their system can move around this pre-built track, and can stop and start at specified locations.
- Teams may manually select the power transmission to start, stop and change direction.
- Scoring will be based on Design Process, Team Work, Safety, Creativity and Performance.

What is a Suspended Monorail Train?

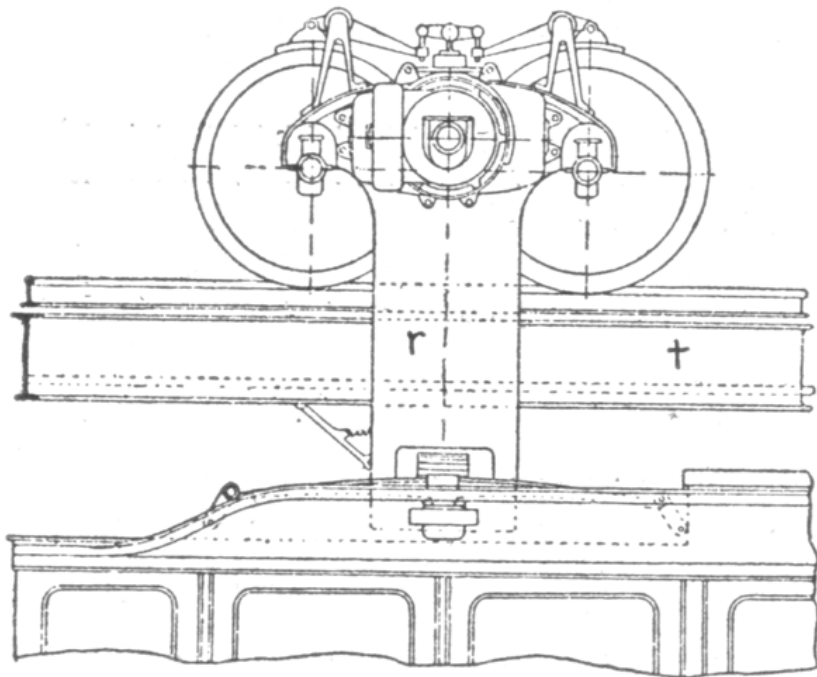
The suspended monorail is a transit system used to transport people and things above the ground without impacting people and transportation systems below.

The monorail concept has many advantages that are important in today's congested cities. They require minimal horizontal and vertical space; they have lower construction costs compared to conventional rail systems; they create less noise pollution; and they do not interfere with existing transportation systems.

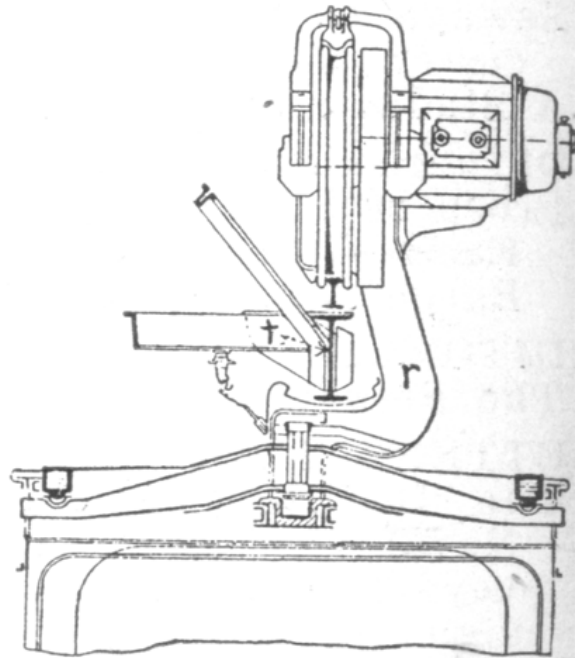
The suspended monorail system has also been adopted by industry to transport large items from one work station to another in assembly and processing areas.

How it Works

The monorail chassis consists of a powered wheel assembly. The wheels are mounted in parallel and attached to the chassis at the top of the passenger car. The monorail wheel drive assembly runs on a single rail and has to be able to navigate curves without coming off the track. Typically, this is accomplished by the wheel assemblies being hinged at the monorail chassis. The following diagrams will help you picture what a typical assembly looks like.



Side Elevation.



Cross Section.

Fig. 2.—Detail of Truck for Langen Ry.

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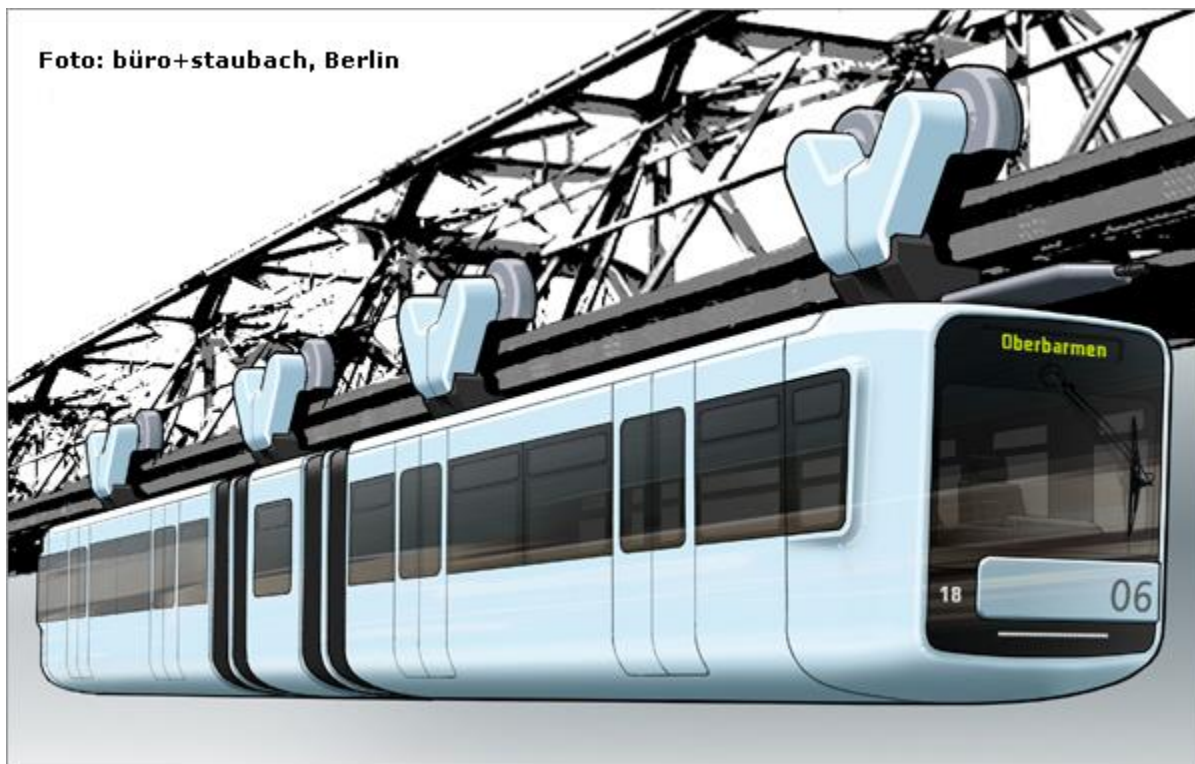


Foto: büro+staubach, Berlin

<http://www.subchat.com/readflat.asp?ld=1254062&p=1#1254214>

History

The first suspended monorail system began construction in 1898, and it has been in operation since 1901 in the German city of Wuppertal. Today, the system has over 13 km of track and 20 stations. The train has a top speed of 60 km per hour, and it transports 75,000 passengers daily.

The German concept was based on a horse-driven suspended monorail designed by English engineer Henry Palmer in 1824. In 1897, German engineer Carl Eugen Langen tested the prototype seen in this first image below.





<http://scribol.com/art-and-design/architecture-art-and-design/germanys-incredible-hanging-railway/>