

## Application No. 800: Floating thanks to XXL magnets

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### Levitating above repelling neodymium magnets

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#### Fascinating magnetic repulsion

It is a commonly known fact that unequal magnetic poles attract each other, while equal magnetic poles repel each other. But can magnetic repulsion be strong enough to keep a person hovering steadily?

Just so you know: It works! But only with a complex construction and XXL magnets, the "Monolith" from supermagnete.fr, which can hold 200 kg! The following video illustrates the detailed assembly of this exciting experiment.

YouTube Video: [www.youtube.com/watch?v=-xZHdJ4exng](https://www.youtube.com/watch?v=-xZHdJ4exng)



#### Materials needed

- Solid wood
- Steel angle bracket (massive)
- Wooden screws
- 4 mm steel cable
- 8 turnbuckles
- 24 wire cable clasps
- Reinforced punched sheet
- 8 giant magnets MONOLITH ([www.supermagnete.fr/eng/Q-111-89-20-E](http://www.supermagnete.fr/eng/Q-111-89-20-E))



#### Wooden base construction

All beams are solid wood and 2 m long. That makes for a total diameter of over 4 m! The lower cross serves as support. The beams will be connected to each other (slightly staggered for better stability) with 100 screws and steel angle brackets.



Angle bracket and wood make for a very sturdy construction that won't give in.



Why wood? Anyone who has worked with magnets knows that wood works well with magnets: it's not magnetic, easy to manipulate, but stable nevertheless.

The steel angle brackets are good for hooking up a steel cable (large opening).

Preliminary results: 4 m diameter, more than 100 screws, 8 angle brackets, 4 turnbuckles.



## Wooden floating construction

A large wooden beam is divided into three and pushed together sideways. The planks next to each other make a large enough area for a person to sit on.

Now screw on 2 wooden slats in the shape of a cross - suitable for the base construction. This connects the planks and serves later to attach magnets as well as angle brackets for the steel cables.

Base and upper construction on top of each other, slightly raised, to simulate the floating with the magnets.

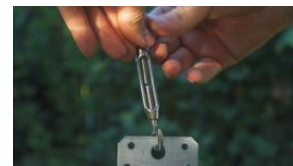


## Steel wire construction

The turnbuckles are hooked up to the punched sheets. Here you can see the turnbuckles in the "tightened" position, i.e. screwed in. Before attaching the cable they will need to be opened up.

Now the steel cable is hooked up to the turnbuckles. The 4 mm steel cable has a holding power of 186 kg with very little expansion. I need a high initial tension to prevent the magnets from turning away sideways. That's why I intentionally used four individual cables.

The cable is now fixated with wire cable clamps. For safety reasons I didn't use just one but three clasps at each end. That makes 6 clasps per cable and a total of 24.



## Attaching Monolith magnets

All 10 MONOLITH magnets in one box each. Interesting fact: You can only turn the whole stack, not an individual box, because the magnets repel each other so strongly even at this distance. That's exactly what we need for this project.

I left the MONOLITHS in their protective cover to avoid scratches. Each magnets is screwed to the wood in the base construction with two pieces of punched sheet. Not an easy task since the punched sheets, screws and electric drill are magnetic!

4 more MONOLITHS are screwed to the bottom side of the floating board - directly above the magnets on the base construction. Most importantly, the opposing magnets have to repel each other!



## Assembly

Now the floating construction is carefully pulled over the base construction and the turnbuckles are attached to the punched sheets.

It works: The board floats over the base construction! Now the endurance test...



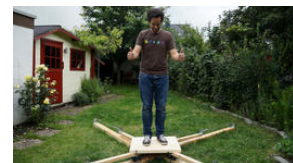
Distance without weight (only own weight of the construction): ~9cm



## Endurance test

The moment of truth has arrived...

Passed the test: The board levitates with me on it! I can even rock a bit and the magnets still don't touch each other.



Distance with my body weight on it: ~3cm



Note from the supermagnete team: More information about "magnetic repulsion" can be found in our FAQ Is the attraction between magnets as high as the repulsion? ([www.supermagnete.fr/eng/faq/repulsion](http://www.supermagnete.fr/eng/faq/repulsion))





### **Articles used**

8 x Q-111-89-20-E: Block magnet 110,6 x 89 x 19,5 mm ([www.supermagnete.fr/eng/Q-111-89-20-E](http://www.supermagnete.fr/eng/Q-111-89-20-E))

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