

Networked Robots Construction

Basic Construction

LEGO units

Building rigid structures versus flexible structures

Building long beams

Vertical beams: width versus height (a brick is 1.2 LEGO units tall)

1 plate = 0.4 LEGO units

3 plates = 1 brick

5 plates = 2 LEGO units

Braces and supports

Gears

Reduction and reversal: A 40-tooth gear turning an 8-tooth gear speeds makes the 8-tooth gear go 5 times faster than the 40-tooth gear

Speed and torque: the product is constant – so you can “gear up” (using a gear with a larger diameter to drive one with a smaller diameter) to go faster, but you lose power – you can’t lift as heavy a load

To make gears mesh – must be correct distance. You can use the Pythagorean theorem:

Distance = $\sqrt{\text{width}^2 + \text{height}^2}$ - but height is really 1.2*height

Close may be enough

Turning corners

Differential gear – allows two axles to turn independently – your robots will turn better.

Worm gears: one-way mechanism, reduction

Rack – rotation -> linear movement