Technical Building Guide

David J. Barnes
d.j.barnes@kent.ac.uk

Introduction

The guide describes how to build a relatively simple model of a 'windmill'. This is a model I use as the starting point for ROBOLAB™ explorations with local schools (grade 7 and upwards). Once hooked up to an RCX, it illustrates motor control and can be extended to illustrate touch-sensor control, for instance.

Parts list

Table 1 shows the list of the required parts as generated by MLCAD. The colors are merely suggestive.

#	Description	Part	Color
1	Electric Technic Mini-Motor 9v	71427C01.DAT	Light-Gray
2	Plate 1 x 2	3023.DAT	Light-Gray
5	Plate 2 x 4	3020.DAT	Yellow
1	Technic Axle 8	3707.DAT	Black
1	Technic Axle Joiner	6538.DAT	Light-Gray
2	Technic Brick 1 x 4 with Holes	3701.DAT	Black
2	Technic Brick 1 x 8 with Holes	3702.DAT	Black
4	Technic Brick 1 x 10 with Holes	2730.DAT	Black
4	Technic Brick 1 x 12 with Holes	3895.DAT	Black
3	Technic Bush	3713.DAT	Light-Gray
2	Technic Plate 2 x 8 with Holes	3738.DAT	Light-Gray

Table 1: Parts list for the windmill model

The Base

Use three of the 1x12 and two of the 1x10 technic bricks to create a base. Place the ends of the two 1x10 bricks on top of the ends of two of the 1x12 bricks. Place the third 1x12 brick parallel with the other two and under the 1x10 bricks, so that there are two spaces between it and one of the other 1x12 bricks (Figure 1). The two closest 1x12 bricks are the back of the base and the third is the front.

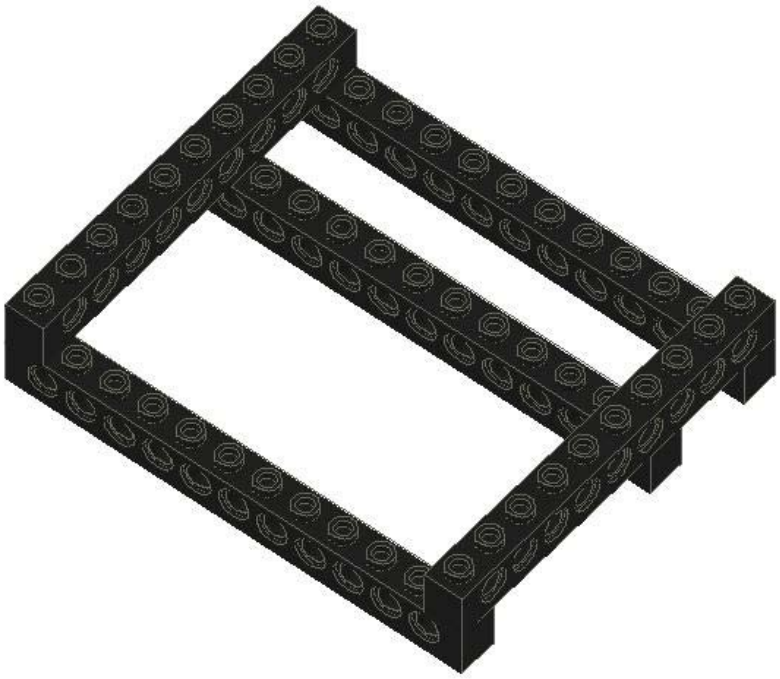

Figure 1: The base of the windmill

The Platform

Place the two 1x4 bricks adjacent to the 1x10 bricks, so that they bridge the two 1x12 bricks at the back of the base. Then place the two 1x8 bricks at right angles to the 1x4 bricks, so that they sit on top of the two 1x12 bricks (Figure 2).

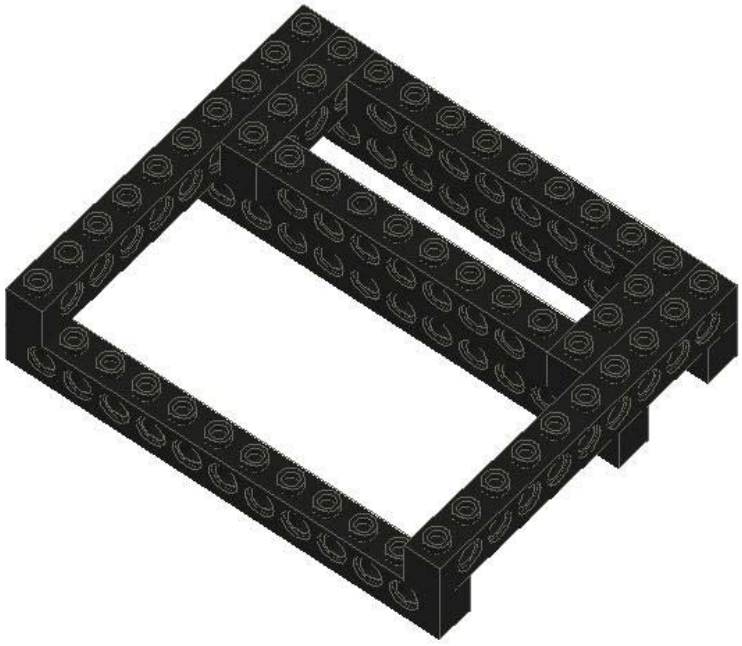

Figure 2: The platform under construction

Place two 2x4 plates at each end of the platform so that each plate links the outer 1x10 brick, a 1x4 brick and a 1x8 brick (Figure 3).

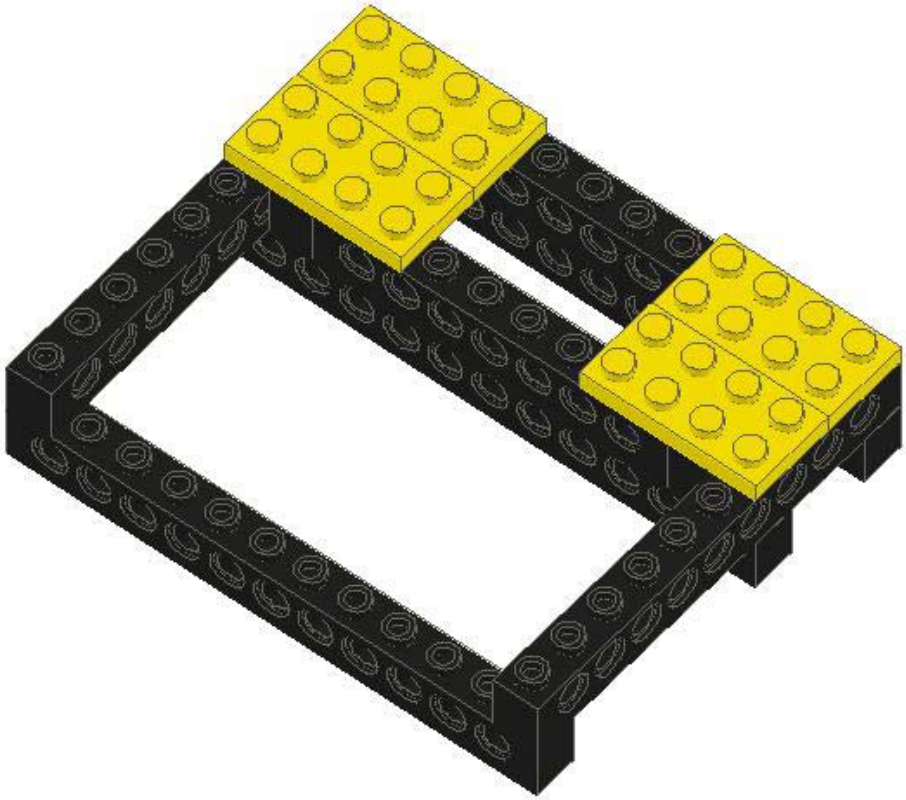

Figure 3: The completed base and platform

In the next step, the motor will later be placed between the 2x4 plates.

The Motor

To the front underside of the motor fix the remaining 2x4 plate. Fix the two 1x2 plates to the rear underside of the motor. Add the axle joiner to the drive shaft of the motor (Figure 4).

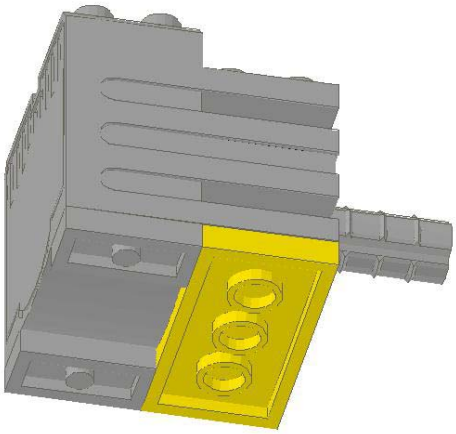

Figure 4: The motor

Place the motor on the platform between the 2x4 plates so that its drive shaft points forward (Figure 5).

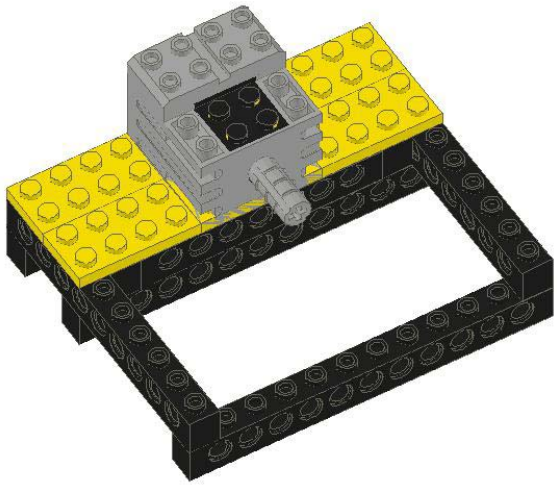

Figure 5: The motor in position on the platform

The Axle

On the front of the base add a 1x10 brick, then a 1x12 brick and a further 1x10 (Figure 6).

Figure 6: Front support

Through the center hole of the upper beam, thread the length-eight axle. Before pushing it into the axle joiner, slip a bush over it. Once the axle has been inserted into the joiner, slide the bush along the axle until it is up against the rear of the front support. Add a second bush to the axle against the other side of the support
(Figure 7).

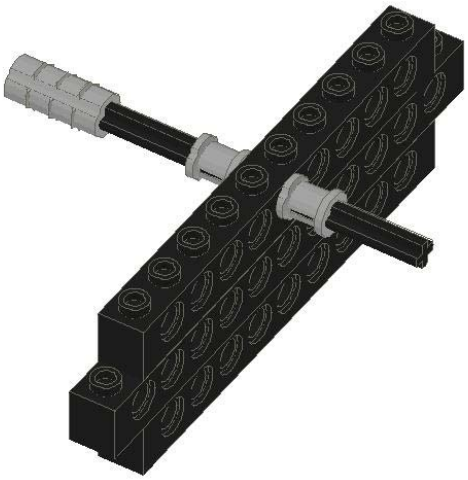

Figure 7: Axle construction through front support

The Sweeps

For the final building step, place the two 2x8 plates one on top of the other in a cross shape and thread these over the axle. Add a final bush to the end of the axle. The curved cuts in one end of the bush should fit between the lugs of the outer 2x8 plate (Figure 8).

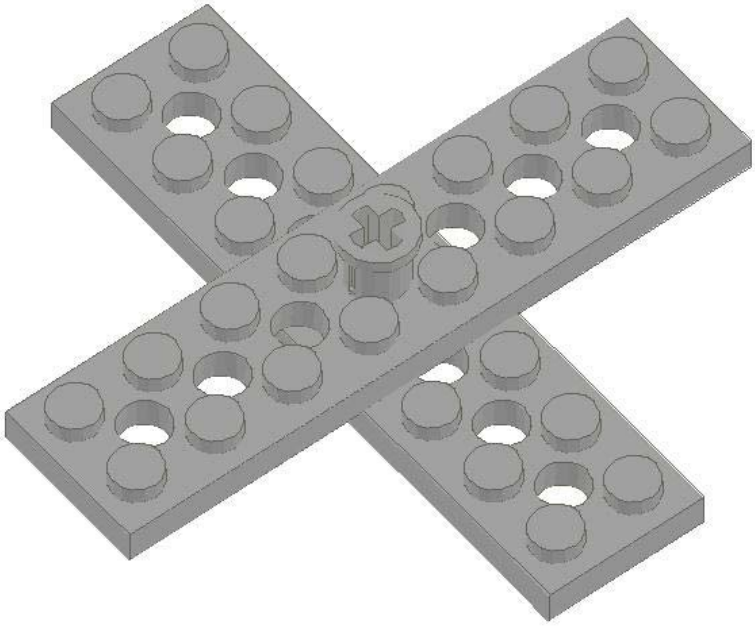

Figure 8: The sweeps of the windmill

That should complete the model. If longer sweeps are required, the base can easily be extended by using further sets of three 1x12 bricks.

All that is left is to join the motor with a connecting wire to an output port of the RCX and you are ready to write a ROBOLAB program to make the windmill turn.