1. Chocolate Break

How to build the Impact Tester

Components

1. Folding 12-mm plywood struts with wooden ‘biscuits’ to slot in for support (x3)
2. Folding 12-mm plywood strut, with milled edge on rounded end and embedded magnet (x1)
3. Labelled components bag, containing parts 7 – 14
4. Folding 18-mm plywood base, containing parts 15–18
5. Pendulum blade holders in 12-mm plywood (x2)
6. Clock face
7. 6-mm Allen key for M8 screw
8. 4-mm Allen key for M6 screws
9. M8 bolt with two washers and wing nut
10. Brass clock hand with M1.6 screw and 10 mm magnet.
11. 12-mm plywood gasket with 3 mm stainless rod
12. M6 screws, 25 mm long, with two washers and a wing nut each (x4)
13. M6 screws, 30 mm long, with two washers and a hex nut each (x2)
14. M4 screw
15. 5-mm ABS plastic gasket (x2)
16. 12-mm plywood gasket
17. 5-mm ABS plastic braces (x2)
18. Mild steel pendulum blade with three holes on one side
Assembly Instructions

1. Remove parts 15a, 15b, 16, 17a, 17b and 18 from the base plate and set aside. You may need to use an Allen key (7) to pull out parts 15 & 16.

2. Unfold the baseplate and position so that the laser engraved side is on top.

3. Unfold all four struts (1a, 1b, 1c and 2).

4. Insert the milled strut (2) in one of the holes on the base plate on the side that does not have the laser engraving on it. The top of the strut should be near the centre of the base plate (4). See fig. a.

5. Insert the other three struts (1a, 1b, 1c) into the base plate (4). The first time, you may need to apply force to get them in.

6. Attach clock face (6) to top of strut 2 with the magnet embedded on the milled strut. Ensure the numbers are facing toward centre and holes are aligned. See fig. b.

7. Attach the clock hand (10) to the clock face (6) using the magnet. Position so that the magnet sits around 90% on the clock face and so that the holes can align. See fig. c
8. Constructing the swinging pendulum blade:
   a) Align holes on pendulum blade (18) with lower holes on pendulum blade holders (5a and 5b).
   b) Thread through longer M6 screws (13), ensuring there is a washer on the outside of both sides of the plywood blade holders.
   c) Screw on hex nuts and tighten gently with Allen key (8).
   d) Insert M4 screw (14) into hole on the gasket with the stainless rod (11) so that the head does not protrude.
   e) Push through screw to connect to pendulum assembly from step 8. The screw will not connect with second plywood gasket (16). 
   Put this to one side until step 10
   See fig. d

9. Loosely attach the ABS braces (17a and 17b) to the struts on each side with the four remaining, shorter M6 screws (12). The braces will sit on the outside of one pair of struts and the inside of the second pair. The round head should be placed on the inside. The wing nuts should be on the outside. There should be a washer next to each screw head and each wing nut.
   See fig. e
10. Threading the M8 bolt (9) through the top of the assembly to lock in pendulum blade and dial. See fig. f:
   a. Place one washer on the bolt, push through the strut (1) furthest from the clock face.
   b. Insert one plastic gasket (15a) into the gap between first and second strut (1).
   c. Thread bolt through the plywood gasket, then the pendulum assembly from step 8; the blade should be centred and the needle (11) should be close to the clock face (6).
   d. Thread through the clock hand (10), taking care that the needle (11) is on the left and the magnet for the hand (10) is on the right.
   e. Thread through the clock face (6), and the milled strut (2).
   f. Insert the second plastic gasket (15b) between the milled strut and the final strut (1). Thread through.
   f. Add the second washer then put on the wing nut, with little to no tightening.

11. Adjust the position of the ABS braces (17a and 17b) so that the right angle on the stop aligns with the bottom of the pendulum blade (18). See fig. g.

13. Calibrate the completed impact tester by working out how far up to hold the pendulum so that the needle goes to 0% when the blade is released and there is no sample in place.