

Practical notes on construction

From cycling to upcycling: learn about energy conversions by building creative installations from old bicycles

- Constructing a frame to support the drive bicycle: whereas the initial student plan used wooden 50 mm × 80 mm struts, our final design used metal 35 mm × 35 mm × 4 mm angle iron. What is important is that the frame securely holds the drive bicycle in place while a child or adult is pedalling.
- We designed our frame to allow flexibility in positioning of the alternator, the pulley of which needs to be in perfect alignment with the rear wheel of the drive bike. We achieved this by mounting the alternator on a separate board, which could be moved into the correct position and fixed with a vice crossbar, also made from angle iron.
- Rims: the drive-cycle rim needs to have the same profile as the pulley wheel. With our alternator, the pulley had a special slotted profile designed for optimizing tension in the car motor. Such a profile was impossible to construct on our bicycle's drive wheel, so we decided to fill in the slots on the pulley wheel with nylon thread and polyester resin, forming a flat profile with sides that could be reproduced on the bicycle drive wheel as follows: narrow aluminium strips that fit within the inner side walls of the bicycle rim were cut and glued in place (hot glue gun works best). Rim tape (found at any bicycle shop) was wrapped around aluminium strips to increase friction and improve belt traction.
- After mounting the alternator in perfect alignment, the drive belt can be measured using string. Ours measured 210 cm, which we ordered from Hostra Gummi und Kunststoffe.
- Connecting the motor to the electronic circuit will depend upon the motor type. Our alternator had internal electrical components specially designed for use in a car, which interfered with the output voltage. Therefore, the outer housing was removed and adaptations were made to tap directly into the output voltage. More simple alternators (12 V or 24 V) can be found online. Motors from paper shredders can also have surprising output voltages.