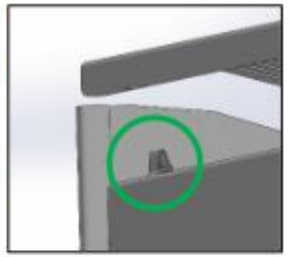
Some case examples of DFMA analysis

Play Station controller

Figure 2 and 3. Difference between the screws in original (left) and improved (middle). Picture of screws on the right.

Convection heater

The joint between the front and the back heater cover can't fit well to each other when assembled because of elastic force. This problem can be solved by redesigning the joint at the back cover.

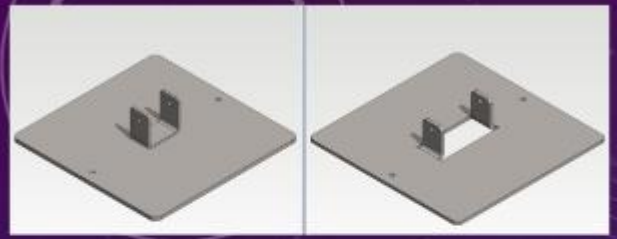


Motor shaft with full-round cross section needs to be rotated to the fan blade. It could be cut a half like at joint position to save time for assembly.

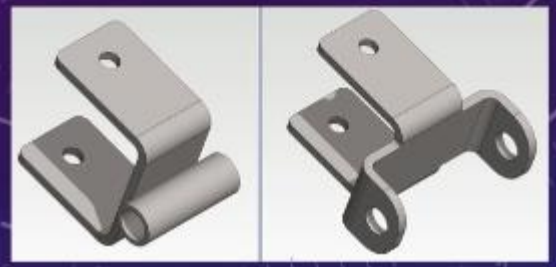
The thermostat and the switch are modular parts. Although they have similar dimensions and positions to the covers, they need two different types of screws to be attached on the covers. This is unnecessary and the screws below could be replaced by the one upper.

Core trainer

Part integration 1 at bottom plate. Combine parts to eliminate welding using same manufacturing processes.



Part integration 2 at middle joint. Design changes are possible to eliminate need of welding.



Part integration 3 at barbell attachment. Design changes reduce required welding and part count.

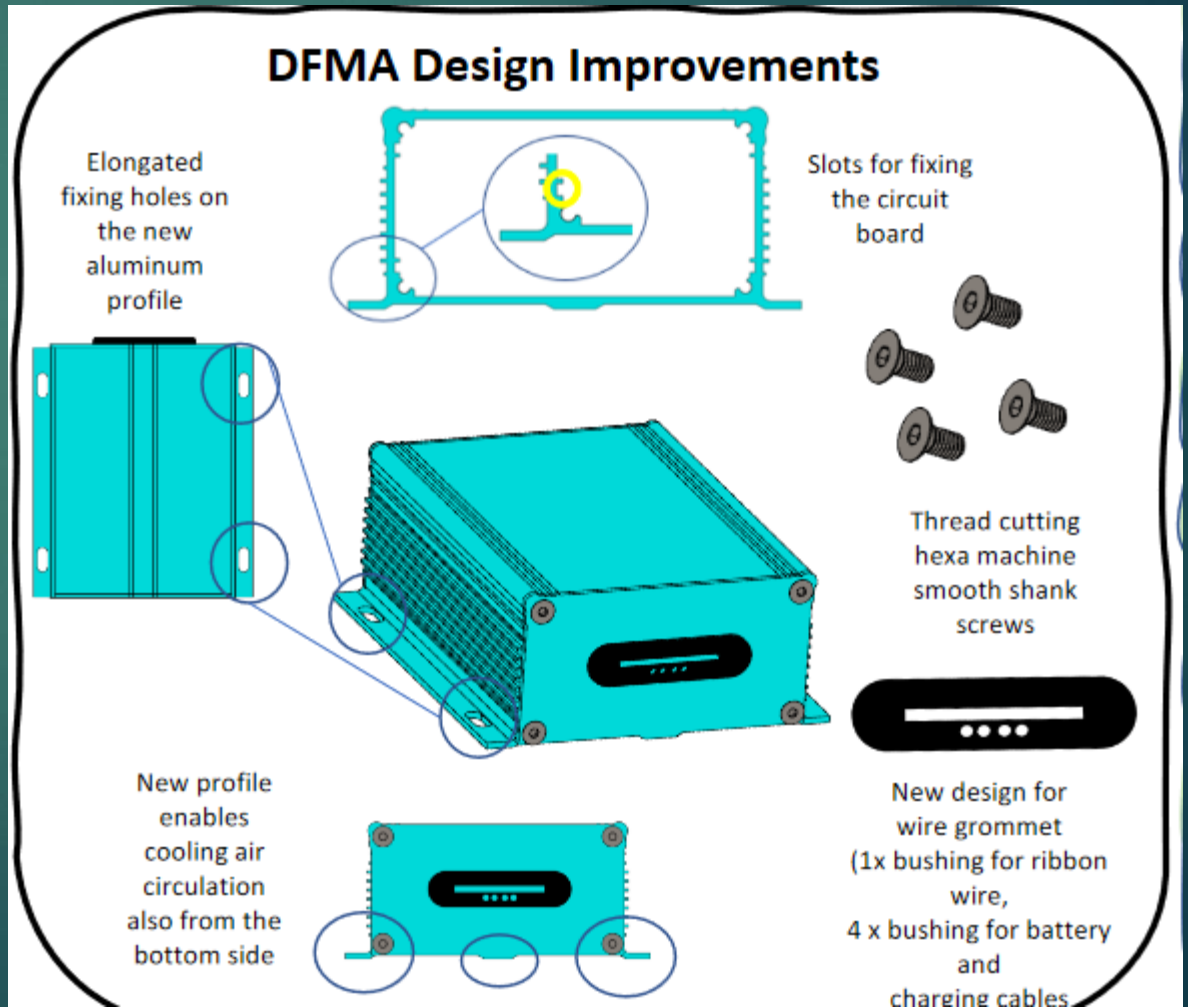
Camera tripod

Spirit lever and control handle could be made from TPU-plastic instead of ABS-plastic

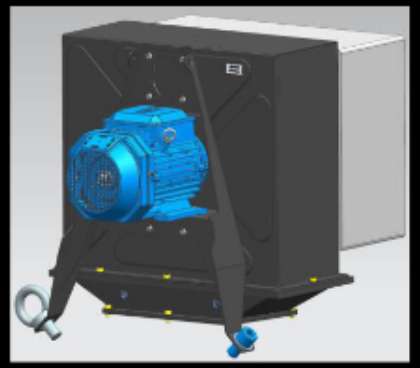
Telescope legs and locking clips could be replaced with rotatable tension lock system

Link rod system could be replaced with sliding pin lock system

Electric bike control unit



Cooling assembly



Existing separate cooling unit
- 63 components
- 24 different component types
- 8 critical components
  - Mounting flange, filter, fan cover, air guide, impeller…

Inefficient to assemble, too many different components, lack of modularization… Unnecessarily complex product architecture.

Nominal effectiveness of assembly work 21,11 [s] / N

Practical effectiveness of assembly work 166,25 [s] / Ncr

Increase feasibility
- Increase modularity
- Reduce amount of part types
- Simplify component designs

DFMA RE-DESIGN END RESULT

Welded bracket
- Total time 3710 s
- Total costs 89,3 €

Sheet metal bracket
- Total time 2700 s
- Total costs 67,2 €

Re-design results
- 54 components
- 10 different component types
- 4 individual critical components
  - Separate cooling unit
  - Fan cover
  - Filter
  - Mounting flange
  - Rest included to sep. cool unit

Nominal effectiveness of assembly work 9,63 [s] / N

Practical effectiveness of assembly work 130 [s] / Ncr

No special components, improved component desings for increased manufacturability. Modularization to ease assembling.