University of Warwick Rail Team

Out-Of-Control Train Challenge

The aim of our challenge is to design a controller for our 1/5th scale locomotive.

Previous Warwick Rail Team Locomotive

The team need a new way of controlling the locomotive (the 'pulling' part of the train) and all its associated components and safety systems. The controller needs to be able to:

- Be turned on and off with a key
- Increase the train speed
- Increase the braking power
- Show with warning lights if there is a braking system fault or if the braking system is turned on

- Sound the horn.
- Stop the train using an emergency-stop button.
- Alert the train driver if there is a fire.
- Show with a light if tractive effort* is being used

You might need to think about what sort of components would be used to achieve this. Would you apply the brakes using a button, or using a lever system? Would you alert about a fire with a light or with a noise?

*Tractive effort refers to the force generated by the locomotive's engine, acting to overcome resistance and enable the movement of the entire train.

Secondary Level Competition, ages 11-16:

You should research and then design (by hand or computer) a diagram of what you would include on your control box and how you would lay it out. You can use the rectangular template below, or you could think of a controller of any shape – perhaps like a video game controller?

Connection wire to the locomotive components
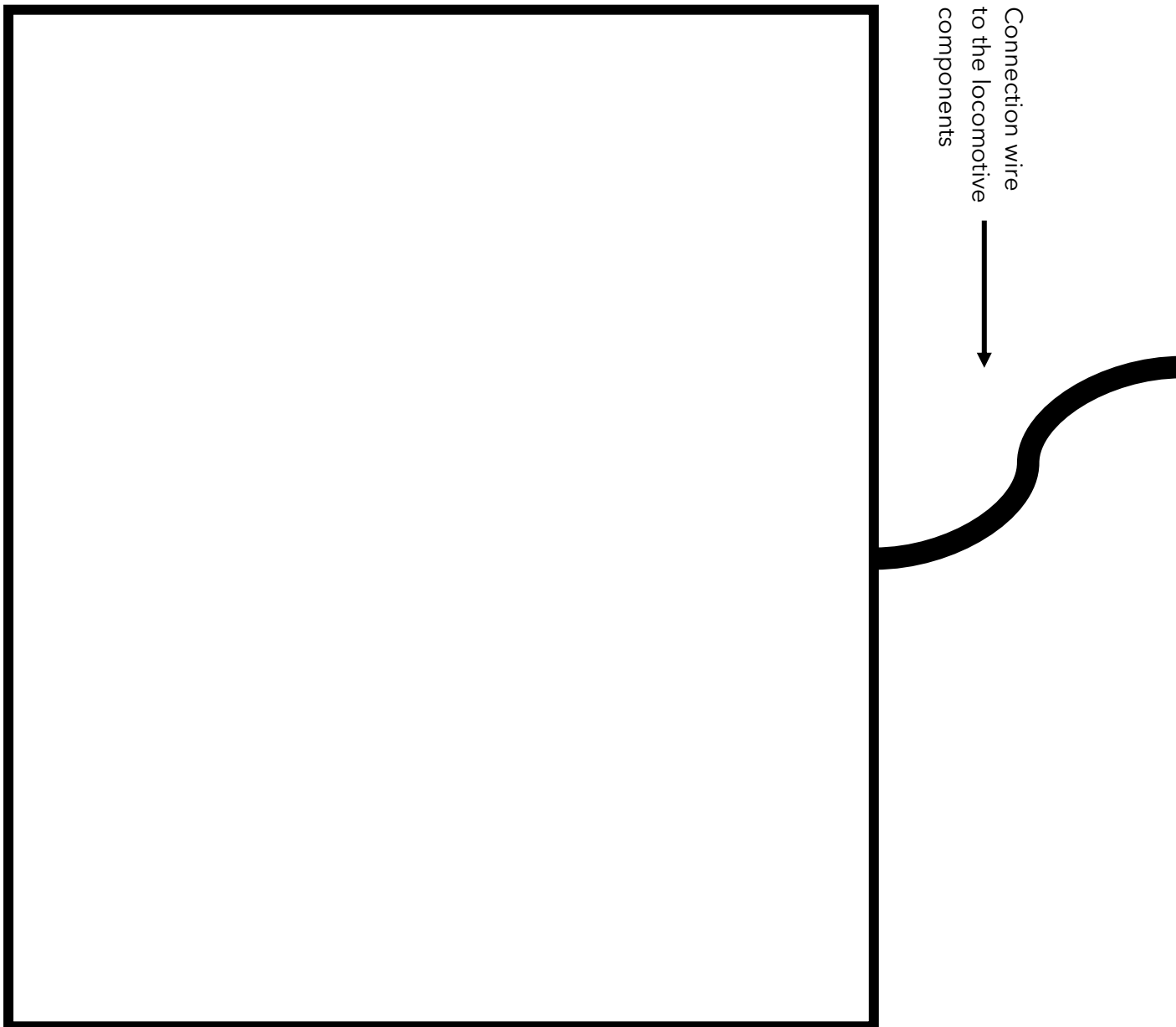
Sixth-Form / College Level Competition, ages 16-19:

For this level of the competition, you should still think about and research what components you would use for the required uses of the controller. However, it would be beneficial if you could demonstrate how you have designed the controller using a 3D design.

A very simple example is shown above of a control box designed in a computer aided design program (CAD). Whilst any CAD program can be used, one easy-to-learn program is *SketchUp*. This can be used online for free at:

https://www.sketchup.com/products/sketchup-for-web

There are good tutorial videos and playlists on YouTube that might help you with learning the basics – but have a play!

If you have any questions about the technical details of the competition, please contact railproject@warwick.ac.uk