

FRESNO STATE[®]

Transportation Institute



**RAILROAD MODEL
COMPETITION**

**Soldering
Guidebook**

Soldering Guidebook

Railroad Model Competition

FRESNO STATE TRANSPORTATION INSTITUTE.....3



SAFETY AND PRECAUTIONS.....4



MATERIALS.....5



SOLDERING.....6



CONTACT US.....9

FRESNO STATE TRANSPORTATION INSTITUTE

Created in 2017 to advance transportation sciences in Fresno County, the Institute results from a unique collaboration between the California State University, City of Fresno and the Fresno Council of Governments and funded through Fresno County's Measure C New Technology Reserve Fund.

In accordance with the Regional Transportation Plan and Sustainable Community Strategy, the Institute has the mission of instigating and developing transportation projects in the following areas:

Education: through courses, training, workshops, and conferences, the Institute seeks to develop and offer advanced education programs to create a skilled workforce that can potentially advance the city and regional transportation planning and other transportation-related fields.

Outreach: to better educate about the importance of local transportation solutions and increase the acceptance for advanced transportation projects in the Fresno County, the Institute organizes games, competitions and other events aimed at K-12 students and the general public.

Research: through the collaboration with graduate and undergraduate programs at Fresno State and other academic partners across the Central Valley, the Institute incentivize research projects that seek solutions to the unique transportation challenges faced by Fresno County and its neighbors, such as reduced mobility, poor air quality, traffic congestion, and high energy demand.

Technical Service: to facilitate the pursuit of transportation-related projects by local agencies and firms, the Institute provides resources and technical expertise to help its partner organizations prepare and submit proposals for obtaining project grants and other funding.

Safety and Precautions

Soldering Iron:

- **Wear Personal Protective Equipment such as safety glasses, long sleeves, or lab coats. (Solder can spit)**
- **If you need clarification on a specific procedure, please don't hesitate to ask your nearest teacher or administrator.**
- **Avoid the fumes caused by the feed as much as possible. Be sure to be slow and careful. Inhalation can cause damage if exposed a lot.**
- **Never touch the tip of the soldering iron! (Will cause burns)**
- **Place the soldering iron back in its stand when it is not used. Never on the workbench.**
- **When finished, please make sure the soldering iron is turned off and unplugged for safety.**
- **When finished, all waste material should be in a lidded container.**
- **Any liquids should be kept away from the equipment during soldering.**
- **If you have been burned, immediately place the burn under cold water for 15 minutes. Please DO NOT put ice on the burn. Please notify the nearest instructor or teacher as soon as possible.**



Materials:

- Soldering Iron and stand
- Personal Protective Equipment
- A damp sponge or soldering iron tip cleaner
- PC board ties
- Feeder wire (Solder)
- Track Cutters
- Railroad tracks
- Railroad joints



Soldering:

1. Grab the tracks you want to solder and put on a jointer to connect both tracks. (Should be able to slide them on)

2. If both tracks cannot join, grab a file and file the parts of the rail that don't fit to get them to slide easily. Ensure they are connected fully, and there is no gap between the other part of the track.



3. Bring the tracks to the soldering station and clean them with alcohol or flux(if provided) before soldering.



4. Approach the soldering iron on the bench and turn it on to about 600 - 700 degrees Fahrenheit.



Soldering Guidebook

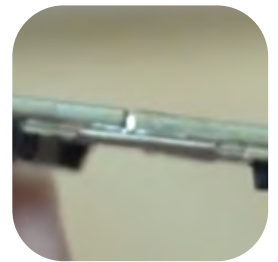
Soldering:

5. Before using the soldering iron on the tracks, please use the tip cleaner to remove anything stuck on the tip by having a bit of solder and immediately scrunching inside the tip cleaner. (Tip should be shiny)

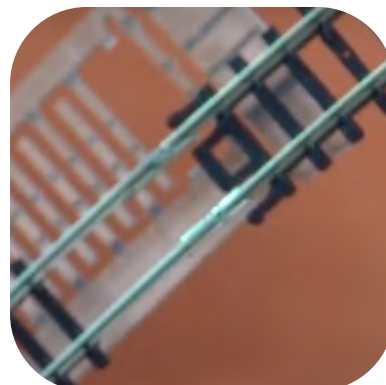


DO NOT TOUCH THE FRESHLY ADDED SOLDER ON THE RAILROAD. Wait around 5 minutes before touching.

6. Carefully feed the soldering iron with the solder while close to the rails you wish to join. The solder should flow right into the gap when it is hot enough.



7. Consider adding PC board ties if many middle rails are removed. Ensure the boards with indents face you behind the railings.



Warning:
Be careful with the tip.
Don't get too close to the
fumes or touch the metal
part. It will burn!

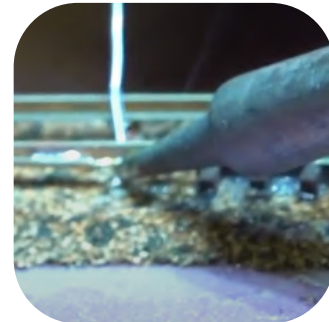
Soldering:

8. Break a piece of the PC board ties, apply it on the back of the rails, and aim more for the middle when soldering. Always remember to clean the pieces before you solder. After carefully soldering the parts with the wire, please go slowly.



9. When soldering on the actual board, please refer to the video below:

[Video](#)

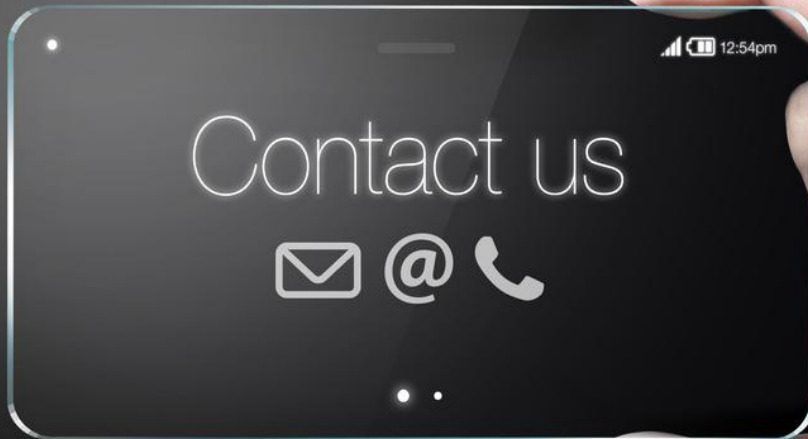


10. Look at this video for more instructions when soldering wires.

[Video](#) at 3:05



11. Repeat any previous steps for the rest, and always be cautious.



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