

# Energy-harvesting Railroad Tie

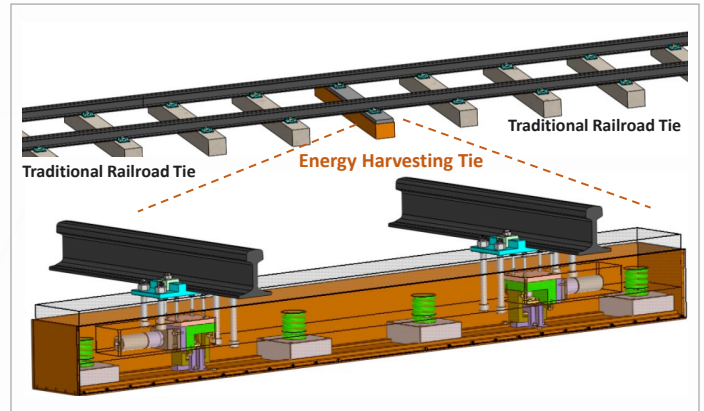
VTIP 21-066: “Railroad Energy-harvesting Tie for Powering and Charging Railway Applications”

## THE CHALLENGE

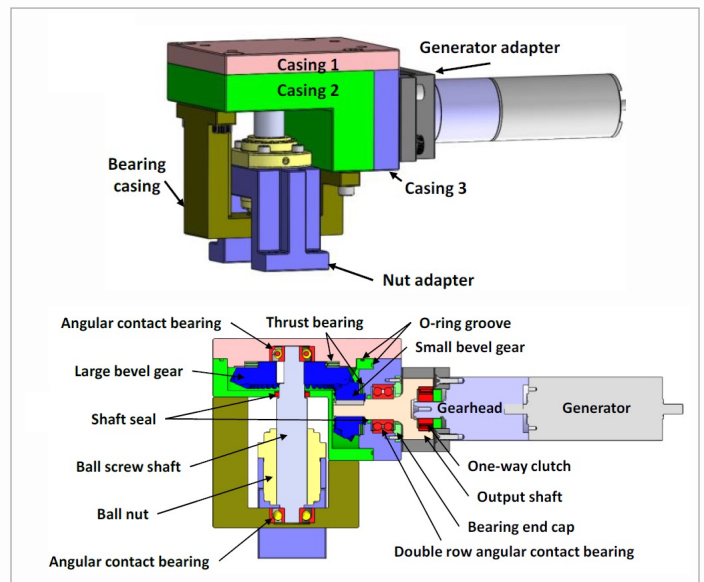
Railroad applications such as safety equipment, signal lights, crossing gates, and wireless communications to monitor rail safety and infrastructure health are often required in remote areas or tunnels where traditional methods of delivering power are difficult.

## OUR SOLUTION

The Center for Vehicle Systems and Safety (CVeSS) and the Center for Energy Harvesting Materials and Systems (CEHMS) at Virginia Tech have developed an energy harvesting railroad tie which uses electromagnetic generators that are coupled with an efficient motion transmission to convert the kinetic energy of the rail into electrical energy. This energy harvesting tie enables power generation with every passing wheel in a configuration which is robust to the railroad environment and is inconspicuous to avoid theft or vandalism. The harvester is able to generate tens of watts average output power, enabling the powering of trackside electrical equipment to improve operational safety and efficiency.



The overall design of the invented energy harvesting railroad tie. It has similar dimensions to a conventional railroad tie so it can be installed and maintained in the same manner as a standard tie on the track.



A detailed design of the energy harvester inside the invented energy harvesting tie.



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