

Trackside System: Sensing/Responding to Changing Conditions

Norfolk Southern Corporation has implemented Wayside Top of Rail (TOR) systems that dispense lubricant onto train tracks in high friction locations, such as tight curves. The system consists of a 100 gallon tank, a pump, and a battery. An external solar panel is positioned in the area to charge the battery for a minimum of four hours per day. The pump currently runs for a quarter of a second for every 12 axles, resulting in 0.13 gallons per 1000 axles. The locations where these systems are installed have an average of 8000 axles per day but a high standard deviation makes a standard refilling schedule hard to implement. The lubricant inside the tank must not sink below the pump connection because air inside the pump will cause failure and the pump will need to be replaced.

The Dual Liquid Electrical Sensing System, using ultrasound & audio cavity modes, will monitor the level of lubricant and shut off the pump when it sinks below the tolerance level. The new system must not modify the tank but should be placed in the electronics cabinet, which currently houses the battery and pump. The lubricant has the consistency of latex paint and will solidify if exposed to air for a period of time. The status of the amount of lubricant will therefore be displayed inside the electronics cabinet so the contents will not be exposed. The addition of an external wireless communication system is an extra feature that would give convenience of remote monitoring of multiple systems from railway inspection.

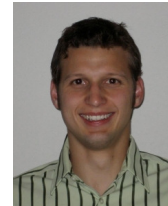
<http://www.egr.msu.edu/classes/ece480/goodman/fall08/group08/>



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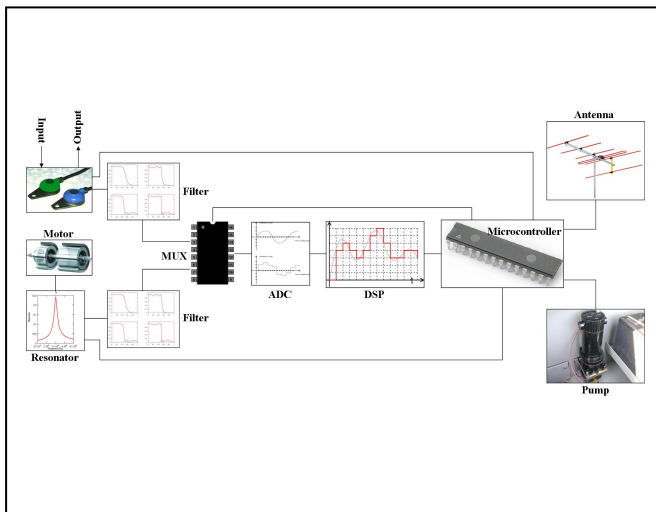
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