Altitude Vehicle Information System Applications Using Ultrasonic Waves and Total Vehicles in the Tunnel

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Abstract
A tunnel which often passed by vehicle, is generally not equipped with sensor of height, amount, and crowding status in the tunnel.

Measurement device of height, amount, and crowding status of vehicle in tunnel was designed in this Final project. It uses application of ultrasonic wave. A couple of ultrasonic transducer (Tx and Rx) is placed above, conduc with road surface. 40 KHz of Ultrasonic wave is emitted, reflected, and received by Rx system. The duration of wave during it was emitted until received can be measured by up-counter and processed by microcontroller system become height level. The vehicle crowding is measured by optocoupler system which is integrated with up-counter and down-counter with the maximum number is 99.

Research is done, it could measure within 6cm until 100 cm of height with 2,4% error, the assemblies of ultrasonic transducer is suggested have 20 cm minimum space from measured object.

Keyword: transducer, ultrasonic, Up-counter, Down-counter
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