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AN IMPROVED AUTOMATIC SIGNALLING ANEMOMETER

In an earlier Letter, an automatic signalling anemometer designed for the use of the Indian Railways, for automatic traffic control over long, exposed bridges was described (Huddar and Wagholikar 1964). One such unit was installed in 1965 on the Pamban Bridge of the Southern Railway after the disastrous accident to the bridge on 21 December 1964. It worked satisfactorily, triggering the railway cautionary signals whenever wind speeds exceeded 39 knots. However the railways decided to lower the safety limit for rail traffic along the bridge to 26 knots as a greater safety measure and to have the anemometer modified to trigger the cautionary signals at wind speeds of 26 knots or more.

Since the cup generator anemometer generates only 2·4 volts at 26 knots and the operation of the miniature relay used in it becomes very critical and unreliable at this level, a transistorised circuit has been designed to ensure positive, trouble free action of the signalling system.

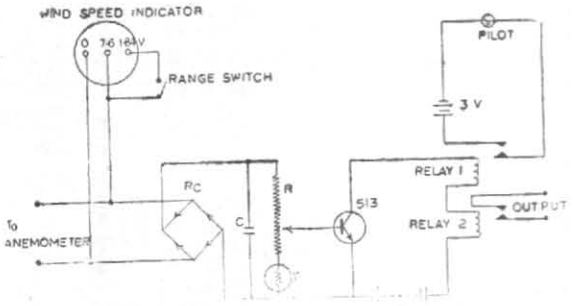

Fig. 1. Circuit diagram of wind warner panel

R=25 K W/W Potentiometer
r=Thermister
C=10 mfd 6 volts electrolytic

In the new circuit the output of the cup generator is fed to the metal rectifier (Fig. 1). The D.C. output from the rectifier Rc is dropped across a potentiometer R and thermistor r. The ajdustable output is connected between the base and emitter of a silicon transistor type 513. The two relays are connected in the collector circuit. In the absence of a suitable D.P.D.T. relay, two small relays are used. One of the relays operates the visual indicator on the indicator panel. The other provides an electrical contact for the operation of any auxiliary signal for controlling the traffic. The operation of the relays can be controlled between 0·86 to 6 volts A.C., by suitable adjustment of the potentiometer R. The thermistor r compensates for the variable gain of the transistor due to the variations of the ambient temperature. The thermistor type B-2B has a resistance of 700 ohms at 35°C and increases to 1500 ohms at 0°C . The condenser C bypasses the ripples of the D.C. output of the rectifier to stop chattering of the relays. The operation of the signals are set at pre-selected wind speeds in the laboratory and the potentiometer is locked at the proper setting.

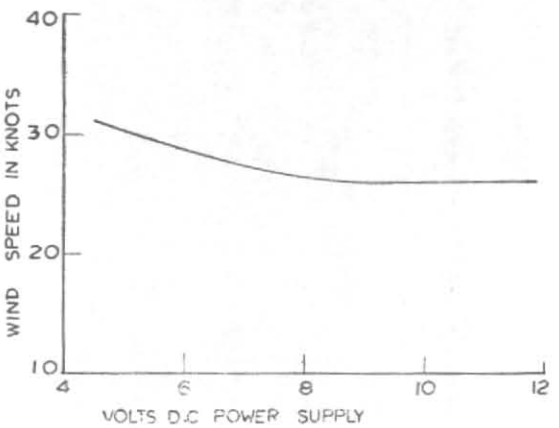

Fig. 2. Characteristics of transistor amplifier using silicon 513

The performance characteristics of the circuit are shown in Fig. 2. It is seen from the curve that the performance of the ampifier is linear up to 6 volts. The accuracy of the performance of the transistor ampifier depends on the battery supply voltage. There is a small change in the performance as the supply voltage drops from 9 volts. It can be seen that at 6 volts and 7·5 volts supply, the relays trigger for 29 knots and 27 knots respectively and a drop in supply from 9 to 7·5 volts introduces an error of only 1 knot. While 9 volts supply would be ideal, the instrument operates satisfactorily even at 7·5 volts.

The transistorized wind warner has since been installed on the Pamban Bridge to trip cautionary signals at either end of the bridge whenever the wind speed exceeds 26 knots and has been operating satisfactorily and efficiently.

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REFERENCE

Huddar, B. B. and Wagholikar, R. R. 1964 *Indian J. Met. Geophys.*, 15, p. 661.