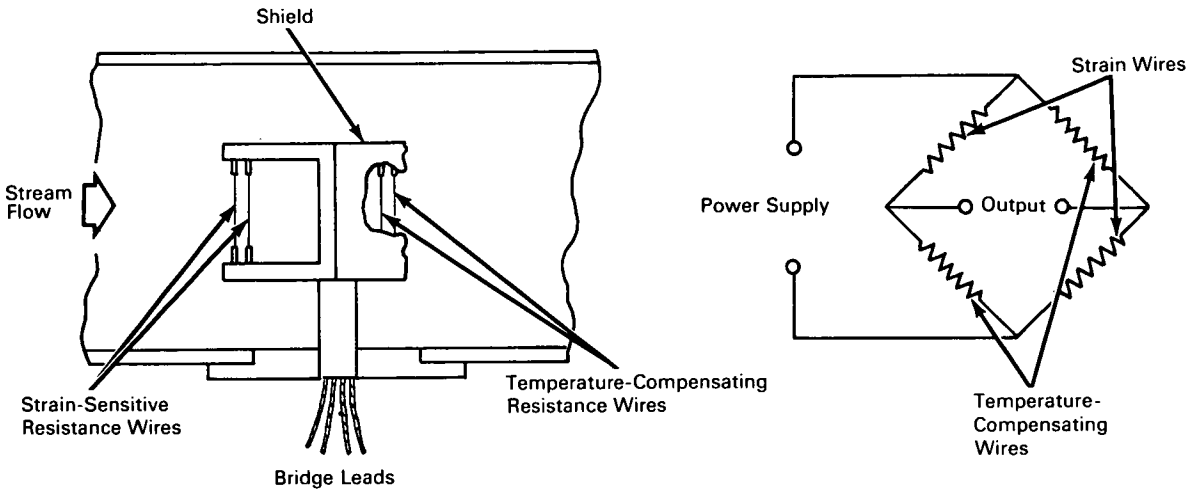
October 1965

Brief 65-10304

# NASA TECH BRIEF



## Improved Strain-Wire Flowmeter Has Fast Response Time




**The problem:** To design a flowmeter that would give an electrical output as a measure of rapidly varying as well as steady fluid-flow rates.

**The solution:** The sensing element of the flowmeter consists of strain-sensitive resistance wires arranged in the form of a conventional Wheatstone bridge. The change in resistance of the wires is measured as a function of stream velocity.

**How it's done:** The strain-sensitive wires are suspended in the flow stream normal to the direction of flow. Two wires forming one pair of opposite bridge legs are directly exposed to the fluid flow. The viscous drag of the fluid, which is a function of stream velocity, strains these wires and therefore correspondingly changes their electrical resistance, in accordance with the strain-gage principle. The other two wires in the bridge are used to compensate for temperature variations of the fluid and are therefore shielded from the stream drag. The unbalance of the bridge due to stream velocity is measured using a conventional power supply and sensitive galvanometer system (not illustrated).

**Notes:**

1. All of the wires should be identical and suspended in the same manner.
2. In case temperature compensation is not required, only two wires would be suspended in the fluid and two external fixed resistors would be used to complete the bridge circuit.
3. The fine-wire sensing elements may be protected by screening against damage from material suspended in the fluid.

(continued overleaf)

4. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio, 44135
Reference: B65-10304

**Patent status:** NASA encourages the commercial use of this invention. It was invented by NASA employees, and U.S. Patent No. 3,114,261 has been issued to them. Inquiries about obtaining license rights for its commercial development should be addressed to the inventors, Mr. Richard C. Dillon and Mr. William R. Dunbar at Lewis Research Center.

Source: (Lewis-241)