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# THE APPLICATION OF SEMICONDUCTOR STRAIN GAUGE IN ORTHOPEDIC SURGERY

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## INTRODUCTION

The principle of strain gauge is to know the strenght of the external forces by measuring the change of resistance. Electric resistance changes according to the bending of electric conductor. If we attempt to measure the strain of several materials, it will be found out easily by means of adhering the strain gauge on the materials to be measured.

*What is the semiconductor strain gaugh?*

There are two types of strain gauge.

- 1) Wire resistance strain gauge (W. S. G.)
- 2) Semiconductor strain gauge (S. S. G.)

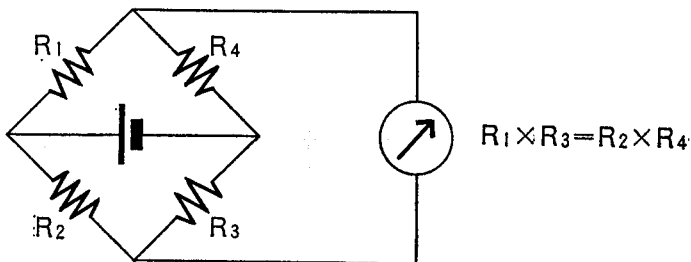
We used semiconductor strain gauge, because this is better by the following reasons.

- 1) smaller
- 2) much more sensitive

## METHOD

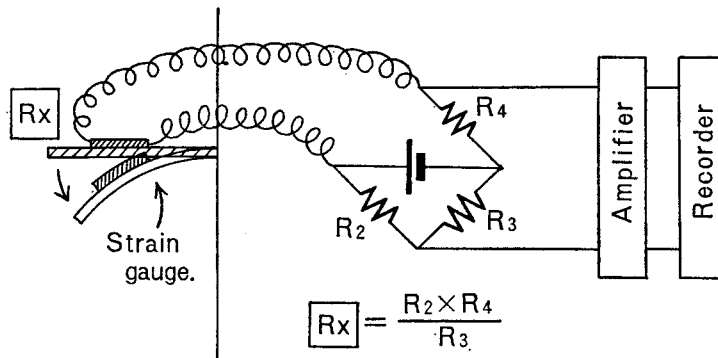
When we measure the resistance, we use the principle of Wheatstone bridge.

Fig. 1 "WHEATSTONE BRIDGE"



When we use the strain gauge as the unknown resistance, the change of resistance will be known. Then, the changes are amplified and recorded.

Fig. 2 Application



For Engineering :

For Medical Electronics : Muscle Tensionimeter, Pulse Meter, Plethsmography, Electric manometer,.....etc.

*For Orthopedic Surgery :* We have tried the following applications.

- 1) Measuring the strain of bone
- 2) Measuring the pressure of foot
- 3) Measuring the pinch power ("pinching meter")

### PINCHING METER

We had a opportunity to know the TOYODA Central Research and Development Lab., world famous motorcar maker.

Owing to the goodwill of this Lab., we could get this meter and try to measure the pinching power of several people. This meter is still experimental and we will better gradually by kind cooperation of this company.