



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF MECHATRONICS

19MCB303 – SENSORS AND SIGNAL PROCESSING

UNIT 2 – ELECTROMECHANICAL SENSOR

Strain Gauge

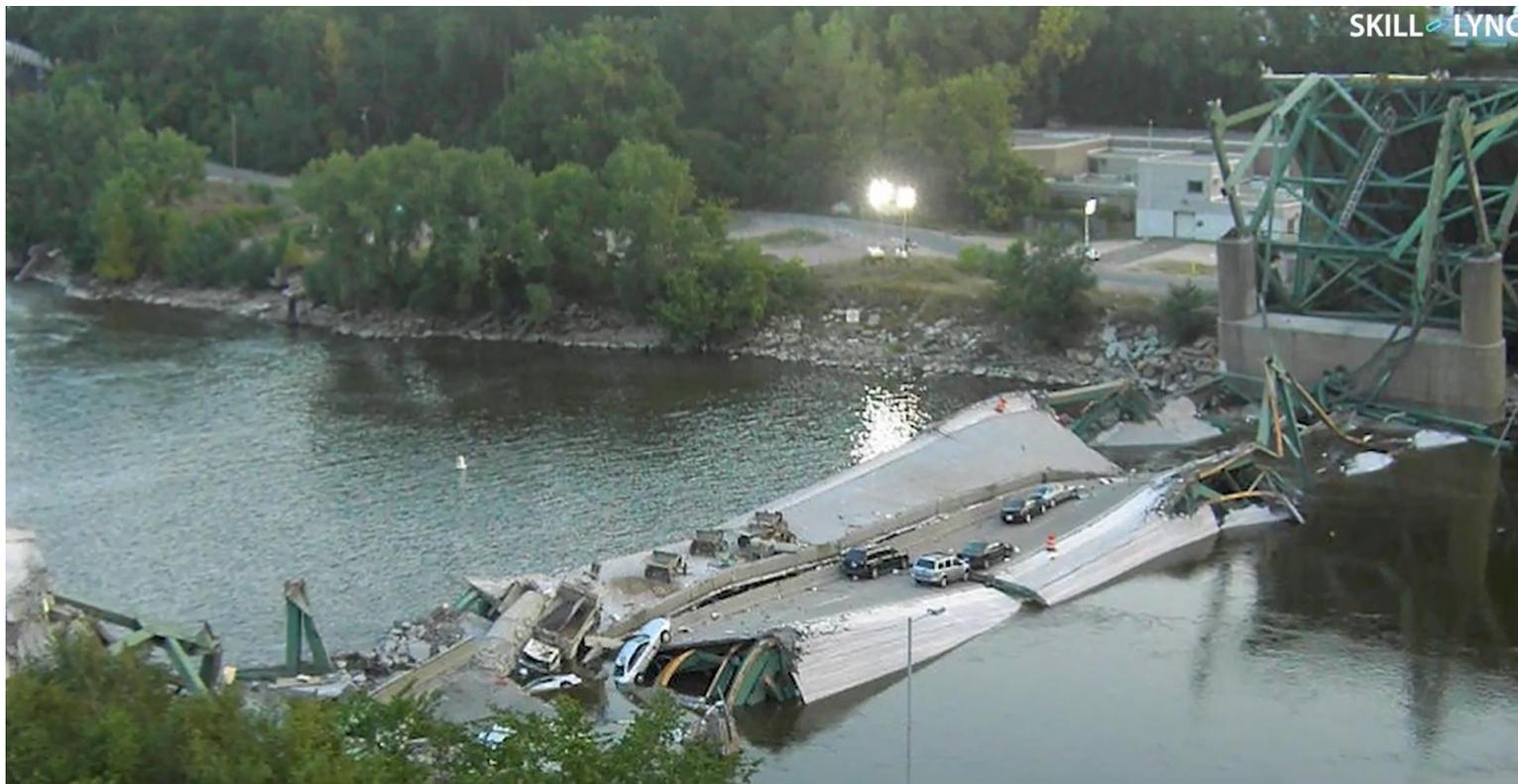
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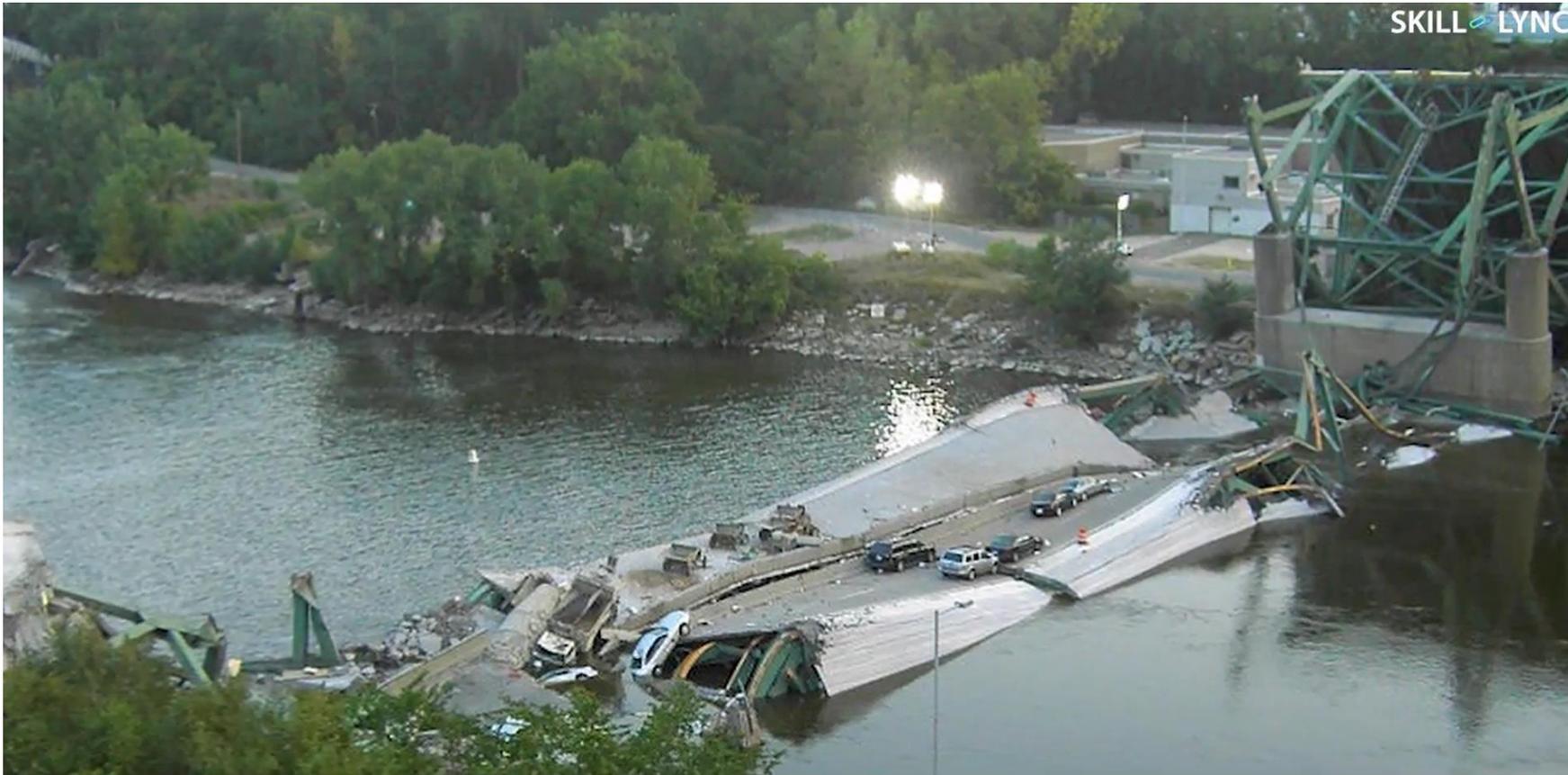
- 2007 - Minneapolis
- 13 People Killed
- 145 injured

REASON



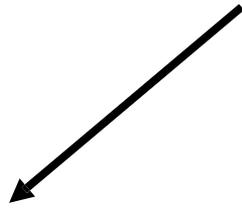
Reason

- The Reason behind it was **Overloading**.
- Overloading Causes excessive strain over a **Bridge**.



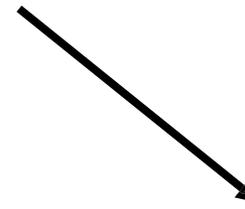


STRAIN



Relative **deformation** or change in shape and size of **elastic**, **plastic**, and **fluid** materials under applied **forces**.

GAUGE

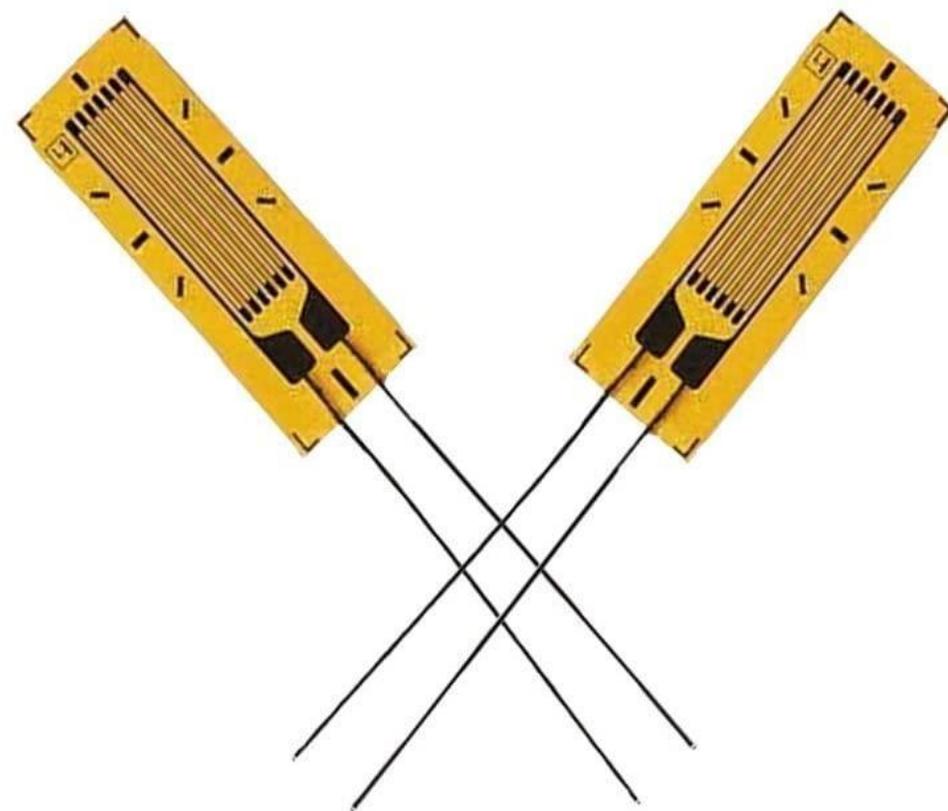


An instrument that **measures** and gives a visual display of the **amount**, level, or contents of something.



STRAIN GAUGE

**Edward.E.Simmons
&
Arthur C.Ruge
1938**





STRAIN GAUGE

Strain Gauges are **electrical** sensors its
Primary use is to **measure**
Force or **strain**.

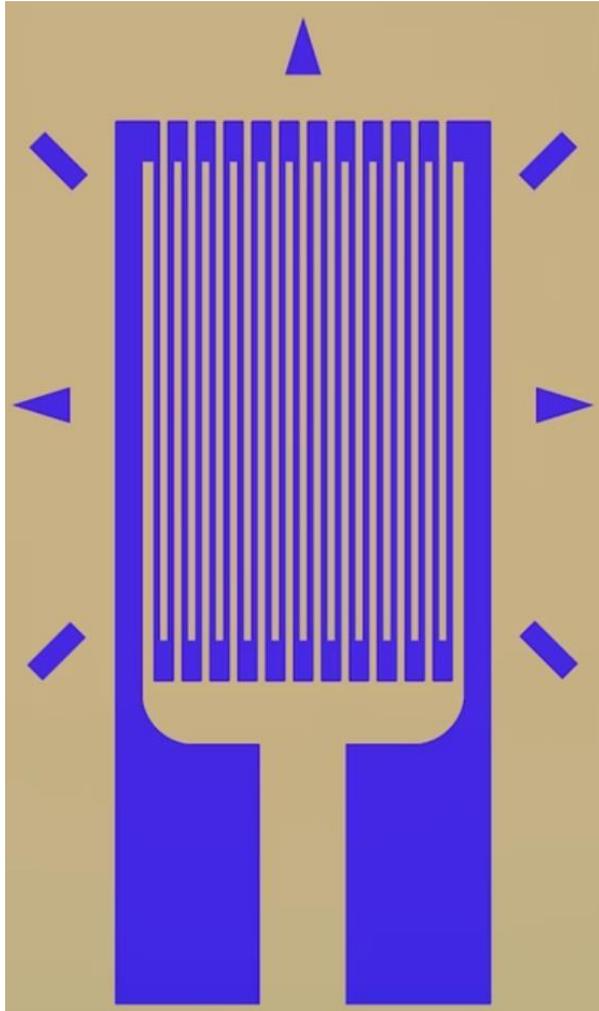


STRAIN GAUGE

The **resistance** of a strain gauge changes when **force** is applied and this change will give a different **electrical output**. Strain gauges use this method to measure **pressure, force, weight and tension**.



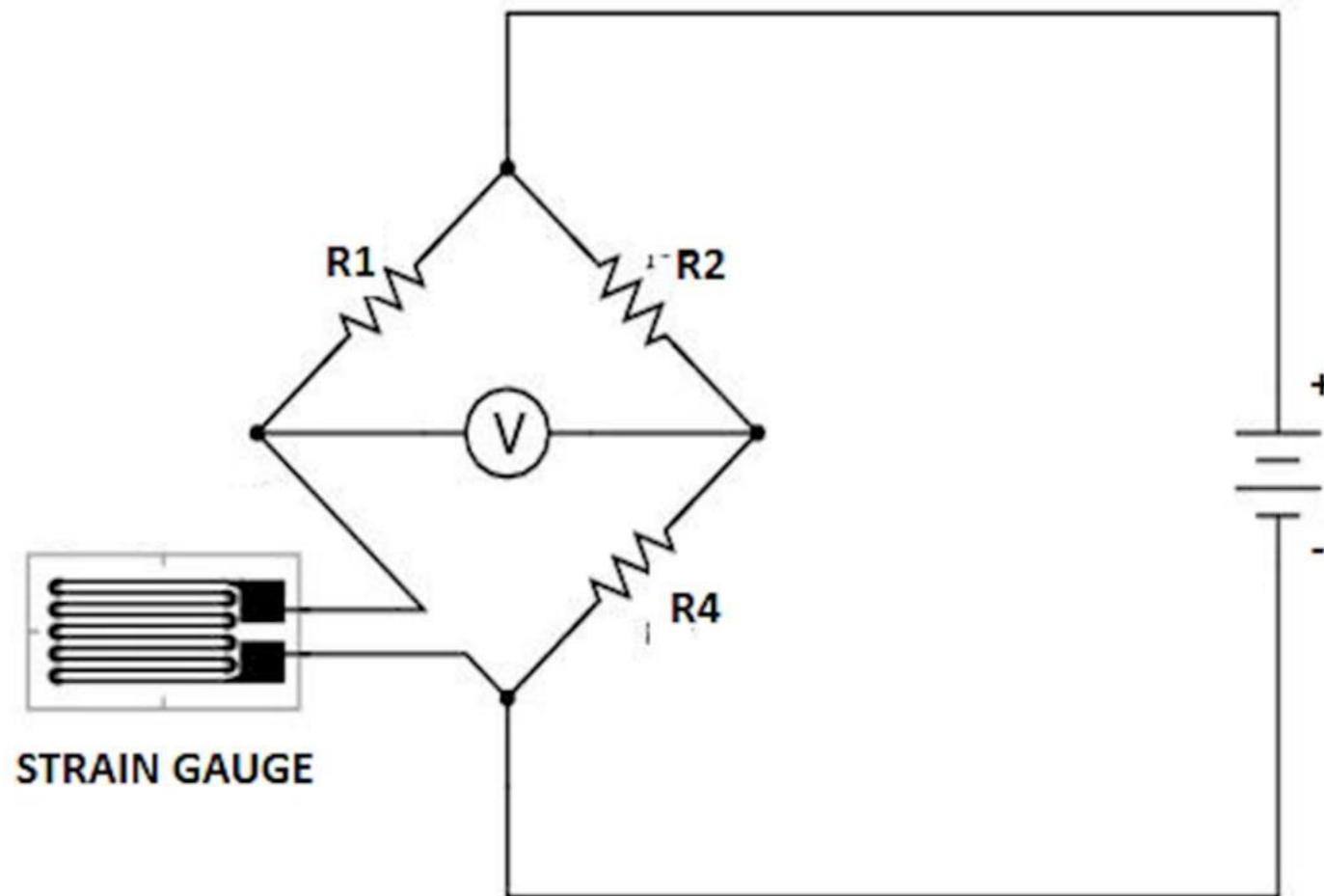
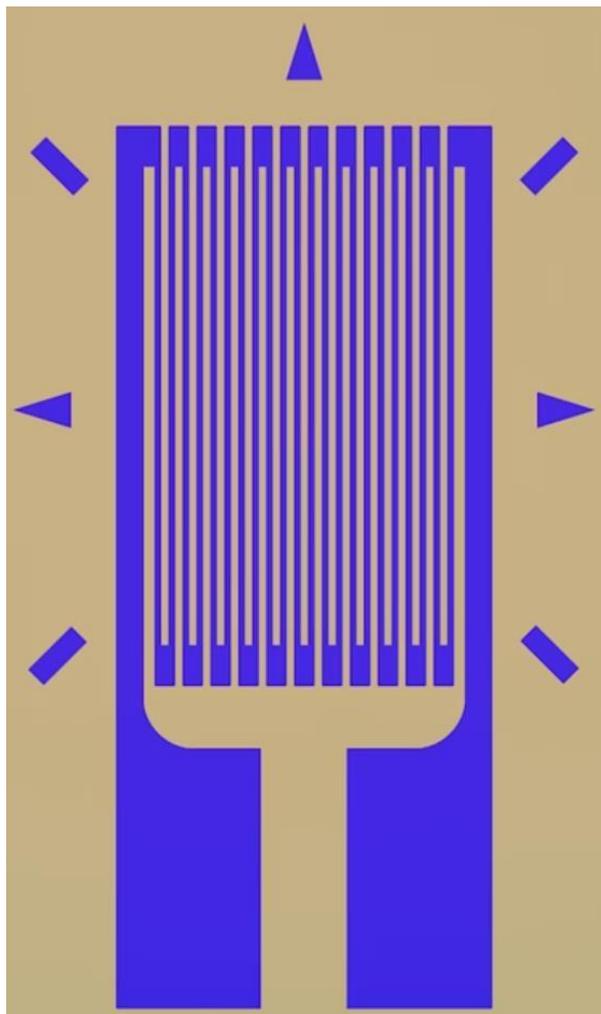
STRUCTURE



- Made of **Metal Strips** called **Measuring GRID**
- **Blue region is conductive** and **resistance** is measured from one large blue pad to the other.
- **3 – 8 micrometer.**
- This **resistance** change, usually measured using a [Wheatstone bridge](#).

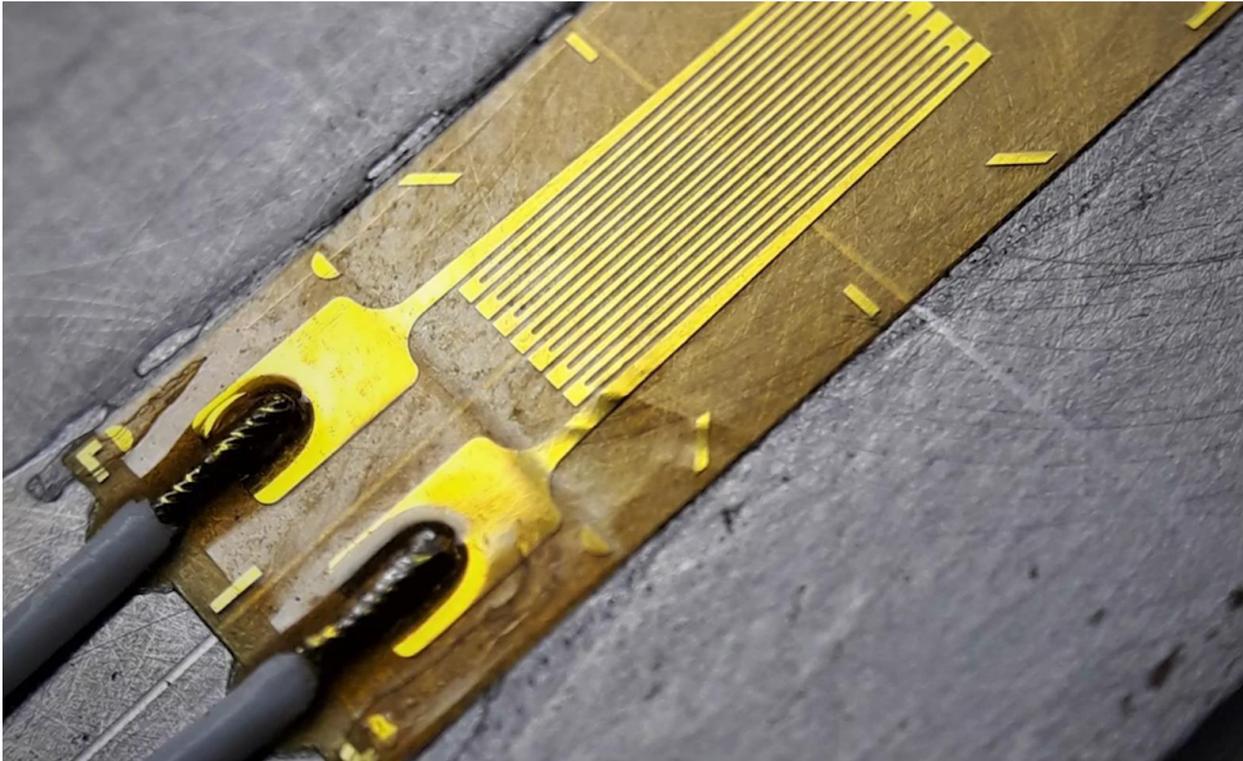


STRUCTURE





WORKING



Object Experience strain



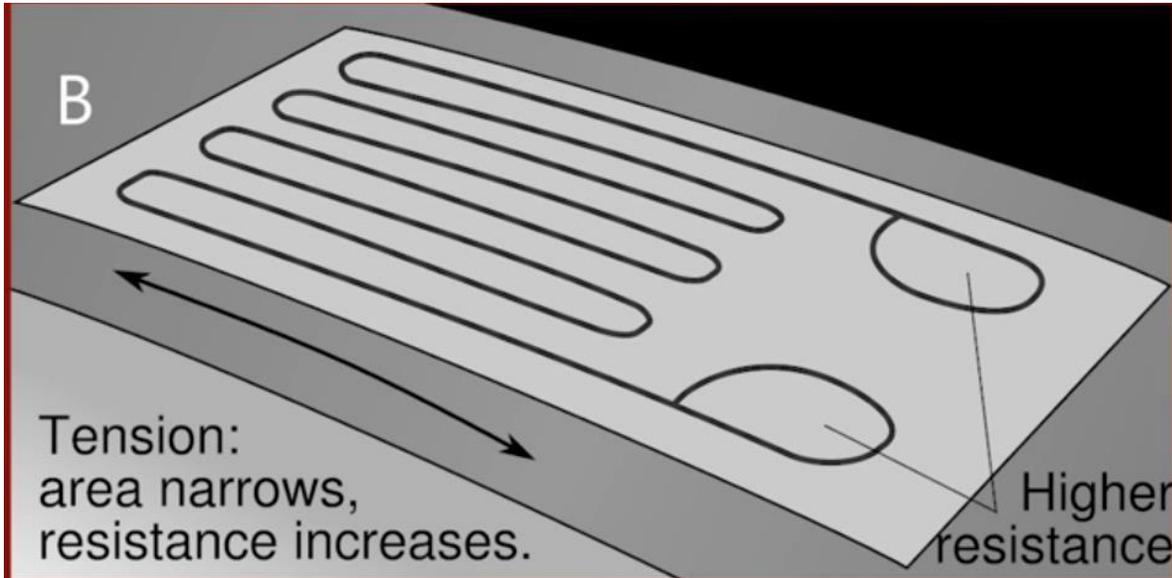
Change in Measuring Grid



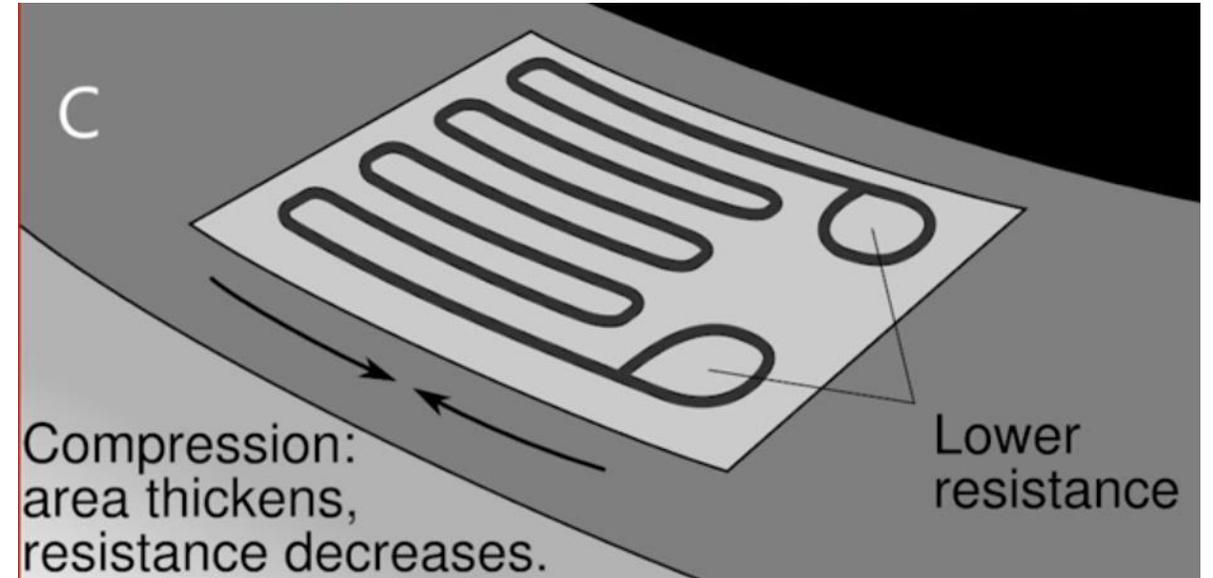
Deformation detected



Working



ELONGATION



COMPRESSION



Application

- Used to **monitor bridges, dams, power plants, etc...**for **Overloading.**
- Used to **measure** the force required to rotate an object in **motors, wheels, and propellers.**
- Fixed to structural **load-bearing** components along load paths of **airplanes** to detect **wing deflection.**



Advantages

- They are highly precise
- They are small and inexpensive and
- They have no moving parts and hence no wear within the limit of elasticity

DisAdvantages

- They are non-linear in nature.
- They are sensitive to temperature.
- They need to be regularly calibrated

Thank You