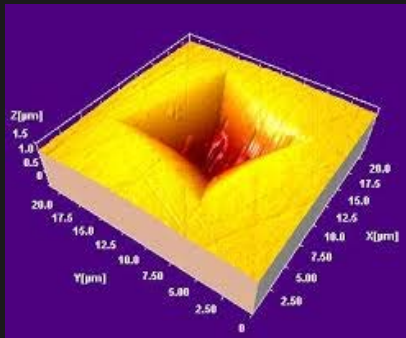


HARDNESS

What is hardness?

- ✓ It is a **characteristic** of a material, not a fundamental physical property.
- ✓ It is defined as the resistance to plastic deformation, usually by indentation, and it is determined by measuring the permanent depth of the indentation.
 - ✓ when using a fixed force (load) and a given indenter, the smaller the indentation, the harder the material.
 - ✓ Indentation hardness value is obtained by measuring the depth or the area of the indentation using one of over 12 different test methods.

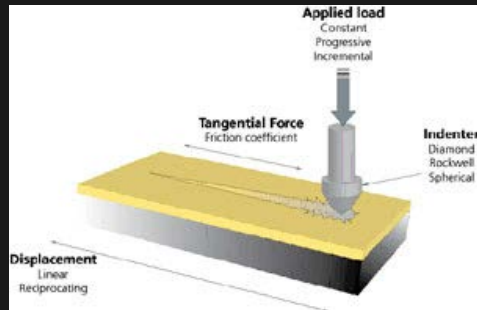


Why hardness testing?

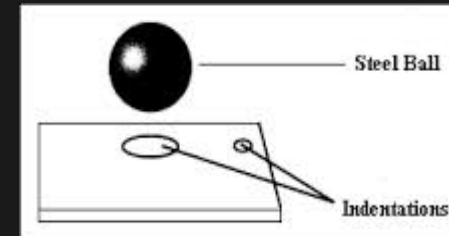
- ✓ Hardness testing plays an important role in materials selection, testing, quality control, and acceptance of components.
- ✓ We depend on the data to verify the heat treatment, structural integrity, and quality of components to determine:
 - ✓ if a material is suitable for its intended use
 - ✓ how easily it can be machined

3 general types of measurements:

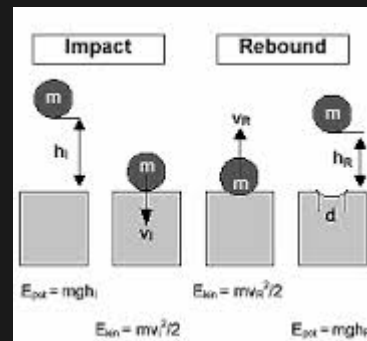
1 SCRATCH HARDNESS



2 INDENTATION HARDNESS



3 REBOUND OR DYNAMIC HARDNESS



Hardness measurement

The best method of measuring hardness is that of producing an indentation on the metal surface



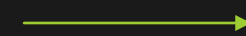
- by pressing against it,
- with a known force (load),
- a body (penetrator, also called “indenter”) made of much harder and thus practically undeformable material
- of suitable shape (a steel ball, a diamond pyramid or a cone).

The "official" tests

✓ Materials testing can be carried out on most materials some tests are really comparative while some give an absolute measure.

✓ The main tests are:

- Hardness test - Brinell, Vickers, Rockwell.
- Tensile strength test
- Toughness/impact test - Izod, Charpy.



The device used to perform a test of this kind is called a hardness tester, or durometer

