SUVA SANGAM COLLEGE

ACTIVITIES WORKSHEET

SUBJECT: APPLIED TECH

YEAR: 13

2021

SUVA SANGAM COLLEGE

Year 13: APPLIED TECHNOLOGY

WEEK 1 DATE: 05/07 – 09/07/2021

STRAND	ENGINEERING MATERIALS
SUB STRAND	MECHANICAL TESTING AND INSPECTION OF MATERIALS
CONTENT LEARNING OUTCOME	Select suitable materials based on its properties
REFERENCE FROM TEXT BOOK	Page: 73 - 75

TYPES OF TESTS

All testing procedures are classified into one or more of the following groups

1. **ROUTINE TESTS** are the primary function of any mechanical testing laboratory.
It is used to verify the manufacturer specifications or examine the results of various production or forming techniques

2. **EXPLOROTARY TESTS** are essential too material research.
Exploratory testing is simultaneous learning, test design, and test execution.
It is used to broaden the knowledge already available and to investigate the newly discovered properties of materials.

3. **DESTRUCTIVE TESTS** entail the complete failure of the specimen and thus have their limitations. They are used in routine testing where the aim is to check whether the specifications are acceptable or not.

4. **NON DESTRUCTIVE TESTS (NDT)** identifies defects before they become problems, without destroying the sample material.
Nondestructive testing services are designed to comply with government contracts, military specifications, industry standards, and designer requirements.

5. **PROVING TESTS** are non-destructive tests.
The aim is to test the production stages and the finished product as specified by the manufacturer.

6. **INSPECTION** may be considered as a type of non-destructive testing procedure and may be divided into two main groups:

i. tests to check accuracy of dimensions specified by the manufacturer
ii. tests to check and locate surface and internal flaws and defects.

Visual examination is the first step to inspect a component and is done with unaided eyes of by using hand lens or a microscope.

Penetrant tests reveal breaks or cracks on the surface of a material

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WEEK 2 DATE: 12/07 – 16/07/21

STRAND	ENGINEERING MATERIALS
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CONTENT LEARNING OUTCOME	Select suitable materials based on its properties
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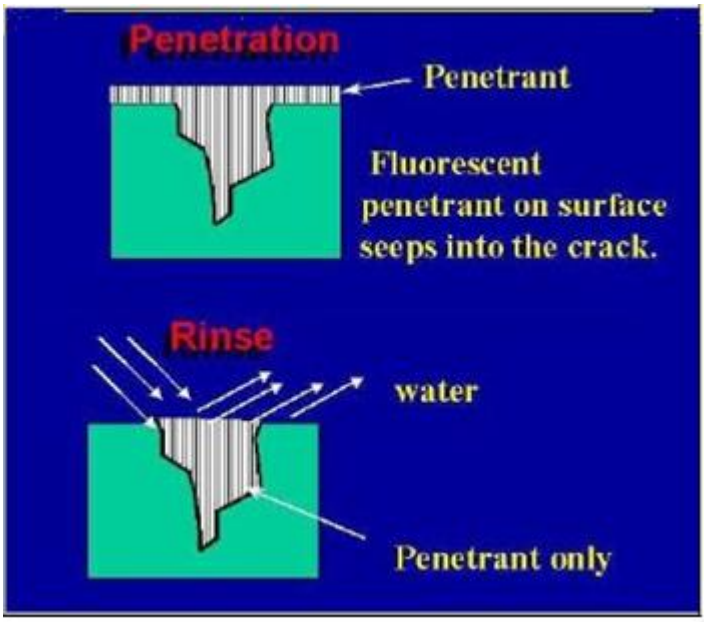
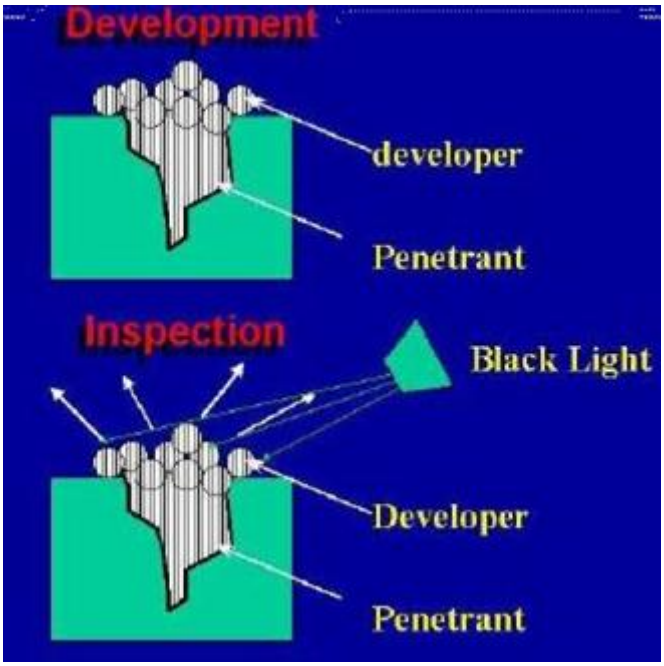
PENETRANT TEST



The cracks and other surf ace deformations are usually the origins of the failure in the material. In addition the surface is exposed to environment and corrosion at attack these areas.

However these are surf ace examinations which reveal only partial information.



Radiation Techniques are used to detect internal discontinuities. X rays are commonly used to reveal the internal information without cutting through the material or part. The radiation is passed through the material being examined and allowed to impinge upon sensitive film. The dark areas on the film are formed by internal defects as they absorb less radiation than a perfect area.

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WEEK 3 DATE: 19/07 – 23/07/21

STRAND	ENGINEERING MATERIALS
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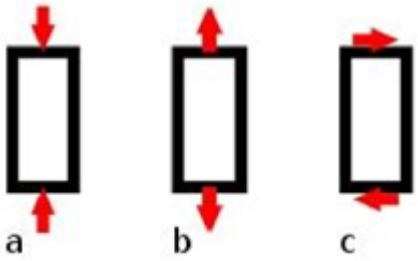
Different types of loadings

Transverse Loading - Forces applied perpendicularly to the longitudinal axis of a member.
Transverse loading causes the member to bend and deflect from its original position, with internal tensile and compressive strains accompanying change in curvature.

Xial Loading - The applied forces are collinear with the longitudinal axes of the members.
The force causes the member to either stretch or shortens.

- **Torsional Loading** - Twisting action caused by a pair of externally applied equal and oppositely directed couples acting in parallel planes or by a single external couple applied to a member that has one end fixed against rotation.

STRESS TERMS



A material being loaded in
a) compression,
b) tension,
c) shear

Uniaxial stress is expressed by $\sigma = \frac{F}{A}$,

where *F* is the force [N] acting on an area *A* [m]. The area can be the under formed area or the deformed area, depending on whether engineering stress or true stress is used.

Compressive stress (or compression) is the stress state caused by an applied load that acts to reduce the length of the material (compression member) in the axis of the applied load.
(in other words the stress state caused by squeezing the material.)

Tensile stress is the stress state caused by an applied load that tends to elongate the material in the axis of the applied load.

Shear stress is the stress state caused by a pair of opposing forces acting along parallel lines of action through the material.

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WEEK 4 DATE: 26/07 – 30/07/21

STRAND	ENGINEERING MATERIALS
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STRENGTH TERMS

Yield strength is the lowest stress that gives permanent deformation in a material.

Compressive strength is a limit state of compressive stress that leads to compressive failure in the manner of ductile failure (infinite theoretical yield) or in the manner of brittle failure.

Tensile strength* or *ultimate tensile strength is a limit state of tensile stress that leads to tensile failure in the manner of ductile failure (yield as the first stage of failure.

Fatigue strength is a measure of the strength of a material or a component under cyclic loading, and is usually more difficult to assess than the static strength measures.

Impact strength *it* is the capability of the material in withstanding by the suddenly applied loads in terms of energy.

Deformation of the material is the change in geometry when stress is applied.

Strain* or *reduced deformation is a mathematical term to express the trend of the deformation change among the material field.

Deflection is a term to describe the magnitude to which a structural element bends under a load.

Elasticity is the ability of a material to return to its previous shape after stress is released.

Plasticity or plastic deformation is the opposite of elastic deformation and is accepted as unrecoverable strain.

TENSILE TEST

It determines how the material will react to forces being applied in tension. As the material is being pulled, you will find its strength along with how much it will elongate.

It is probably the most fundamental type of mechanical test you can perform on a material. Tensile tests are simple, relatively inexpensive, and fully standardized.

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Year 13: APPLIED TECHNOLOGY

WEEK 5 DATE: 02/08 – 06/07/21

STRAND	ENGINEERING MATERIALS
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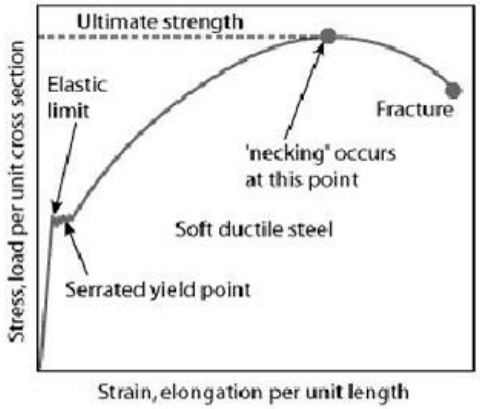
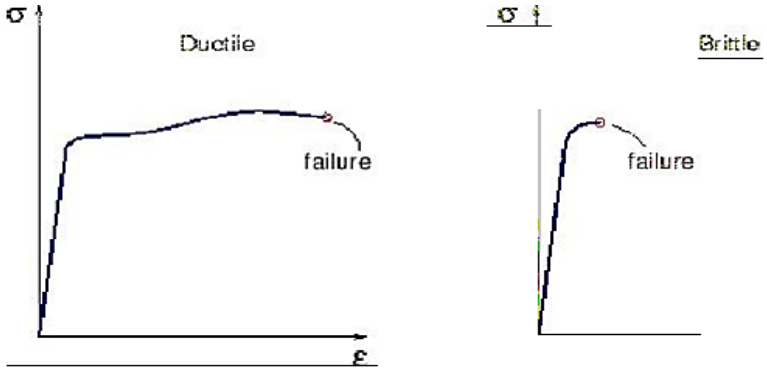
TENSILE TEST

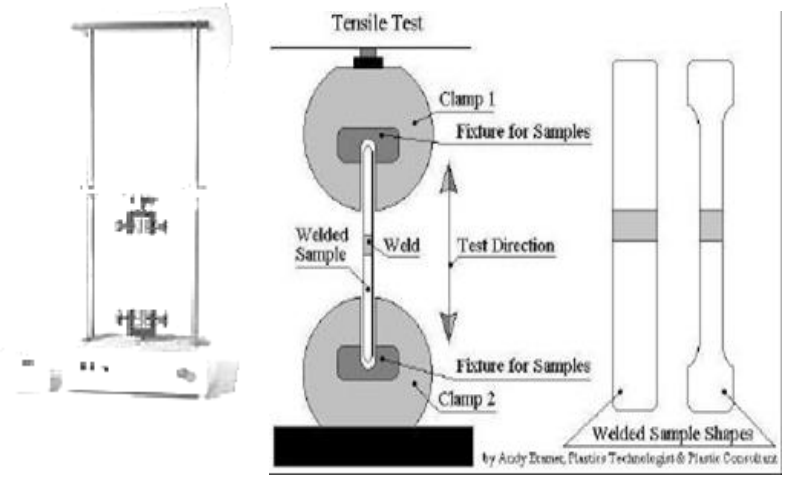
The point of failure is of much interest and is typically called its **"Ultimate Strength" or UTS** on the chart.



Tensile curve of a soft and ductile material



Tensile test machine



The test is made by gripping the ends of a suitably prepared standardized test piece in a tensile test machine and then applying a continually increasing uni-axial load until such time as failure occurs.
Test pieces are standardized in order that results are reproducible and comparable as shown in the figures on the right.

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Year 13: APPLIED TECHNOLOGY
DAY: MONDAY DATE: 05/07/2021

ACTIVITY

1. Write down **two** Mechanical testing.

   _____

   _____

2. Explain the two types of Mechnical test answered in (1) above.

   _____

   _____

   _____

   _____

3. Determine the main groups of non – destructive test in Inspection test.

   _____

   _____

   _____

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Year 13: APPLIED TECHNOLOGY
DAY: TUESDAY DATE: 06/07/2021

ACTIVITY

1. Exaplain the two terms given below:

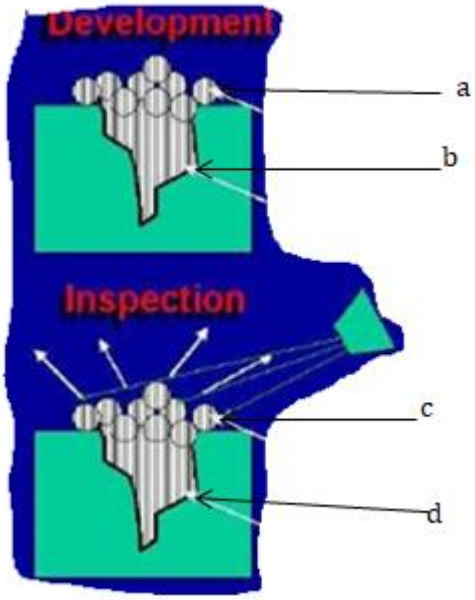
   i. Visual Examination: _____

   _____

   ii. Penetrant: _____

   _____

2. Label the parts shown below on Penetrant test.



3. Illustrate the use of Radiation Techniques.

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_____

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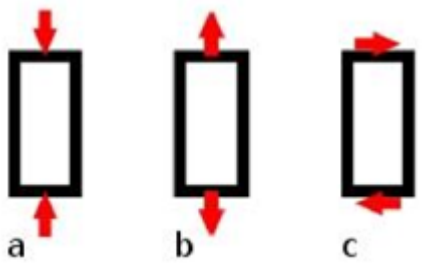
Year 13: APPLIED TECHNOLOGY
DAY: WEDNESDAY DATE: 07/07/2021

ACTIVITY

1. Identify the different types of loads shown below:



a. _____

b. _____

c. _____

2. Explain about Traverse loading.

_____

_____

3. Name two types of Stress.

_____

_____

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DAY: THURSDAY DATE: 08/07/2021

ACTIVITY

1. What is the purpose of Tensile Stress?

_____

_____

2. Name two types of Strength in Mechanical Testing.

_____

_____

3. Explain one of the Strength answered in (2) above.

_____

_____

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Year 13: APPLIED TECHNOLOGY
DAY: FRIDAY DATE: 09/07/2021

ACTIVITY

1. Make a neat sketch of Stress load and indicates the parts.

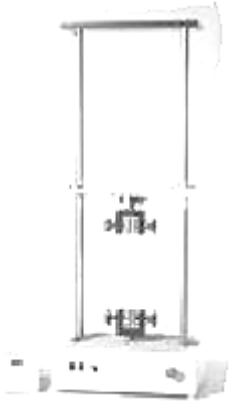
2. Explain how the Tensile test is done.

_____

_____

_____

3. Name the test machine shown below.



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