SHEAR TEST

AIM:

To determine the shear strength (ultimate shear stress) of the given specimen.

APPARATUS:

UTM, Shear attachment to the UTM, shear dies and vernier Calipers.

THEORY:

Shear is caused by forces which act parallel to an area of cross-section and tend to produce sliding of one portion past another, there by changing the geometrical shape of the cross-section. If there is only one cross-section which resists the shear, then the material is said to be in single shear and if there are two cross-section areas which resists the shear force, then the material is said to be in double shear. In case of double shear, the ultimate shear strength will be failure load divided by twice the area of cross-section.

PRINCIPLE:

Ultimate shear strength of the specimen is given by

Shear strength = F/2A – (1)

Where F= Failure load.

A= area of cross section.

Permissible shear strength is



PROCEDURE:

* Measure the diameter of the specimen.
* Set the UTM for the selected load range.
* Set the correct set or dies to assemble the shear attachment with the right set of dies in it.
* Insert the specimen in to the dies so that it projects equally on either side.
* Place the entire bear assembly with the specimen in it centrally over the baring plate on the lower table.
* Bring the lower cross- head close to the top surface of the assembly.
* Float the lower table and set the load pointer to zero.
* Apply the tensile load gradually until the specimen breaks.
* Note the ultimate load applied on the specimen.

OBSERVATIONS AND CALCULATIONS:

* Diameter of the specimen (D) = \_\_\_\_cm.
* Area of the specimen (A) = \_\_\_\_ cm2.
* Failure load F = \_\_\_\_\_\_\_\_ Kgf

Ultimate shear strength = F/2A = \_\_\_\_\_\_ Kgf/cm2

**Questions**

1. Distinguish between single shear and double shear?

2. Distinguish between average shear stress and maximum shear stress?

3. Why Modulus of rigidity is not determined from shear test?

4. Why structural component is designed mainly by considering double shear strength?