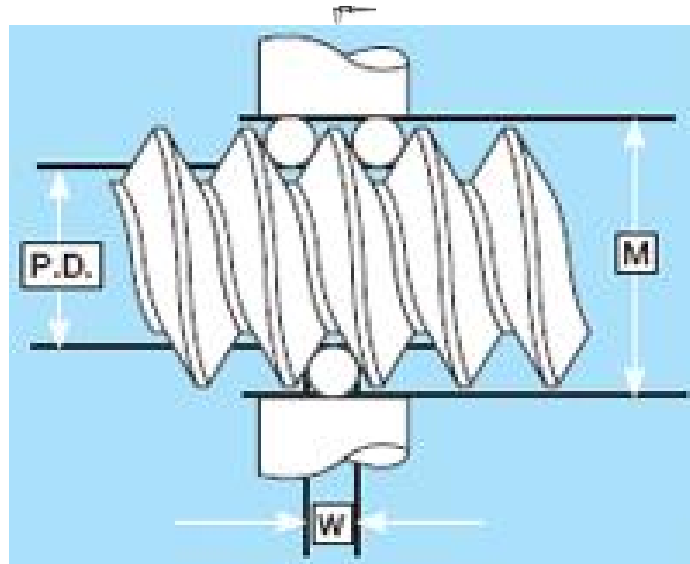## FACULTY OF ENGINEERING
DESIGN AND PRODUCTION ENGINEERING DEPARTMENT

Composite lab II
Credit hour system

<u>Report On:</u>

Thread Measurement using hand tools

Metrology laboratory

Student Name	Remark
Class No:	Signature
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2014/2015

Experiment B

Objective

The objective of this experiment is to find out:

- The major diameter of the screw using an external micrometer.

- The minor diameter of the screw using the thread micrometer.

- The simple effective diameter of the given screw.

- The helix angle using thread micrometer.

Equipment

The measuring equipment used in this experiment are:

Thread micrometer   range 0 to 25 mm.

External micrometer   range 0 to 25 mm.

Thread feeler gauge.

Two block gauges.

1. Measurement of the outer Diameter using External Micrometer:

To measure the major diameter using an external micrometer, the faces of the anvils must be parallel to the axis of the screw being measured to eliminate the cosine error. This will be the case if the diameter of the anvils is greater than the pitch of the crew thread otherwise place two slip gauges between the screw and the anvils.

Measure the anvil of the external micrometer; let it be D. Determine the pitch value of the given thread using the thread feeler gauge.

If the diameter D is greater than 2 pitch, then the major diameter can be measured directly the external micrometer.

R2   R1
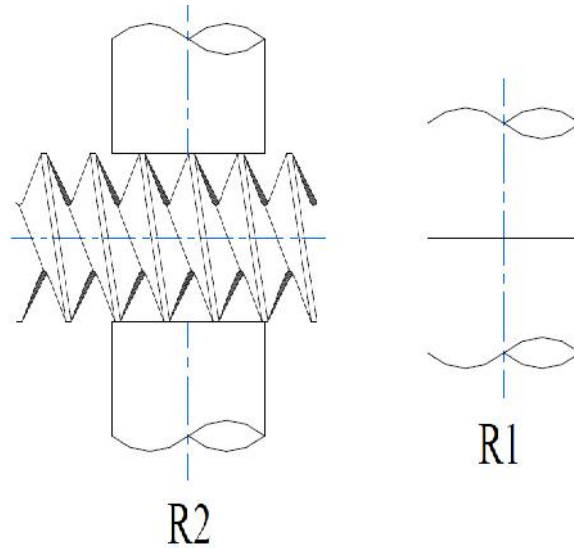
 Take two readings on the micrometer, the first when placing the two slip gauges between the anvils (let this be R1) and the second when placing the screw thread and the two slip gauges between the anvils (let this be R2). Thus the major diameter is the difference between R2 and R1. Repeat this procedure at least three times and take the average.

B) <u>Readings</u>:-

R1			

R2			

C) Results:-

The average of R1=

The average of R2=

The major Diameter (Do) = R2-R1

    Then Do = (-   )   =   mm

2. Measurement of the inner Diameter using thread Micrometer

To measure the minor diameter using a thread micrometer two conical contact members are inserted in the anvils. The angle of the conical members should be less than the included angle of the screw. Using a slip gauge of "t" mm thickness, take the micrometer reading when this slip gauge is placed between the conical members. Let this reading be (R1),   R1=

Remove the slip gauge and place the screw in its place and take another reading. let it be (R2).   R2=
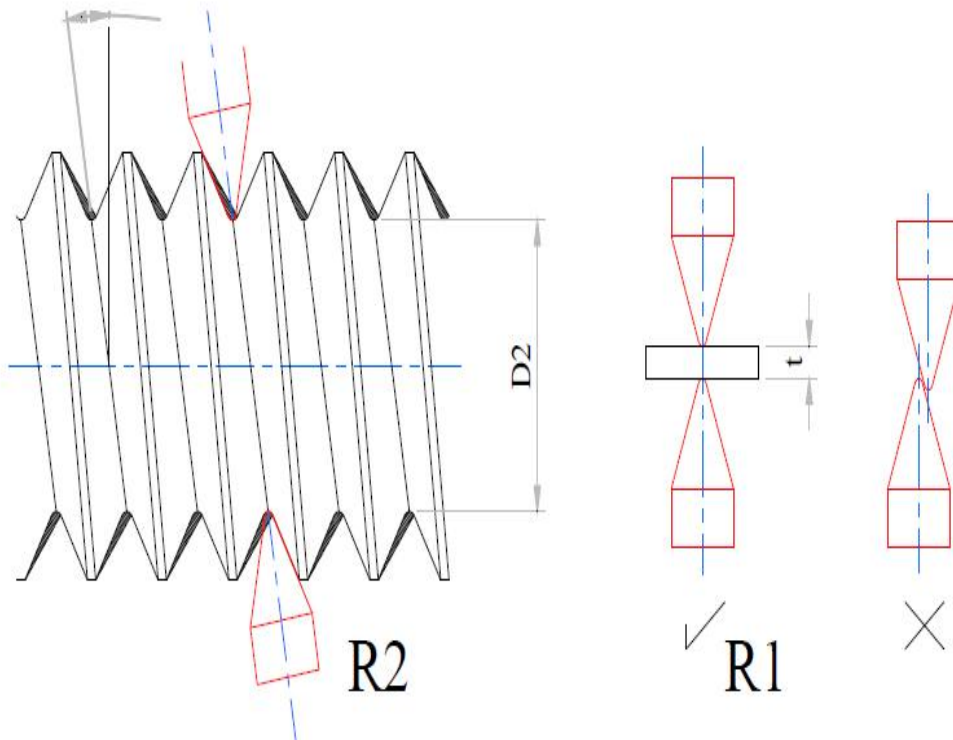
$$T=$$

$$R1=\qquad\qquad R2=$$

Thus the distance (ab) is given by:-

$$ab= R2- R1 +t \quad = \qquad + \qquad + \qquad +$$

However this distance is not the minor diameter because of the cosine error. As the angle (bac) is the helix angle of the screw at the minor diameter (ψ). thus, the minor diameter is given by :-
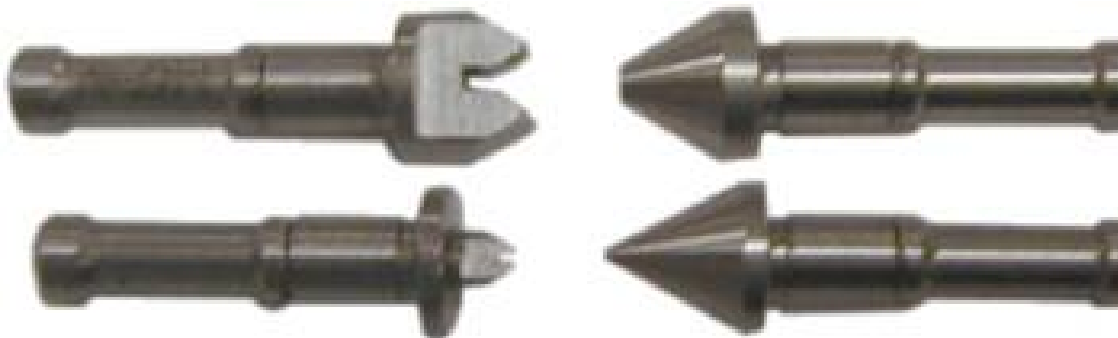
ac = ab cos ψ

Repeat the procedure three times and take the average.

The minor diameter =

## 3. Measurement of the simple effective Diameter using thread Micrometer

Choose two conical contacts from the thread micrometer box; one of which is a male contact and the second is its female contact according to the pitch of the screw.

Close the micrometer with the two conical contacts in place and take the reading of the micrometer, let it R1.
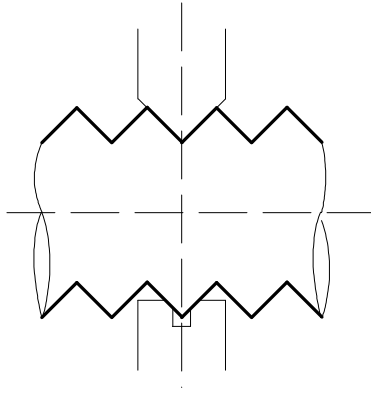
R1=

This reading represents the combination of the sizes of the two contact and the zero error of the micrometer.
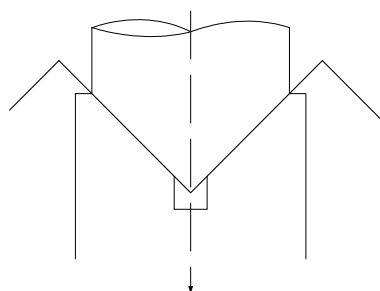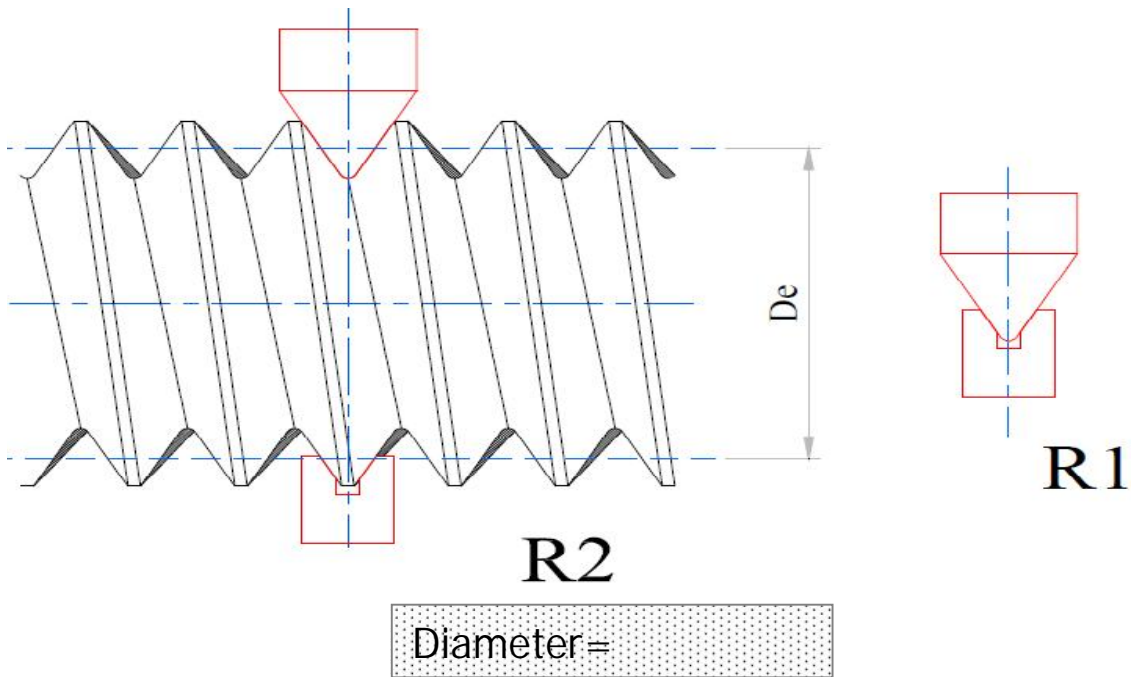

Take the reading of the micrometer with the two contacts placed on the two sides of the screw; let it R2.
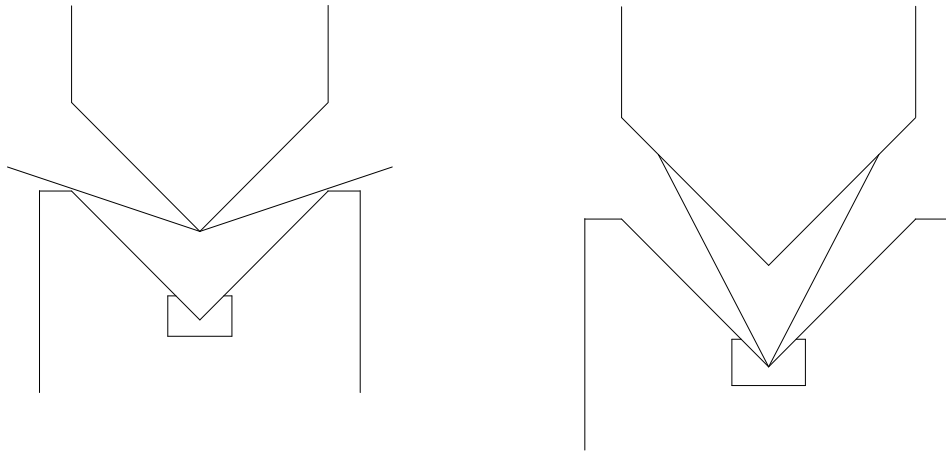
R2=

Thus the effective diameter of the thread is the difference between the two readings R1 and R2.

However, there is an error (   ) developed due to the non equality between the angle of the conical part and the included angle of the screw.

Calculate the error ( ) =

P (1- cot (/2)/ cot (/2))

=

Calculate the Correct Simple effective Diameter

De = R2 - R1 -

= - -

=

Measurement of the included angle using External Micrometer

Measurement of the helix angle using External Micrometer