MEASUREMENT LABORATORY II

Purpose: to be familiar with surface roughness and hardness measurements

Equipment and materials:

1. Taylor Hobson Surtronic 3+ surface profilometer
2. Mitutoyo Rockwell hardness tester
3. Aluminum specimens (turned and milled) for surface roughness measurement
4. Steel and aluminum specimens for hardness testing

The items to be included in the report:

1. Measured data and plots (roughness vs. feed)
2. Description on bearing area curve.
3. Hardness values in comparison with tensile strength data (available in handbooks)
4. Discussions and conclusions.

[AME #1] Surface Roughness Measurement

Procedure for surface roughness measurements:

1. Learn how to use the profilometer from the lab instructor.
2. Measure surface roughness of turned parts using cutoff lengths of 0.8 mm and 0.25 mm.
3. Rotate the part by 90^0 and repeat the measurement.
4. Generate Ra, Rq and bearing area curve.
3. Repeat 2 through 4 with a milled piece at three different locations: at the center of tool path (perpendicular to lay, position A), at the mid-point (approximately 45 degree to lay, position B) and at the outer point (approximately 60 degrees to lay, position C). See Figure 1.

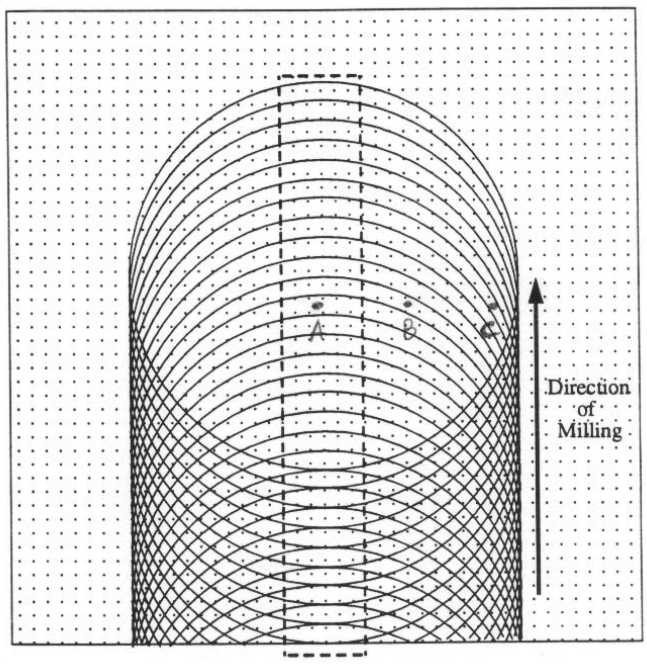

Figure 1 Measurement positions for the milled part.

[AME #2] Hardness Measurement

Procedure for hardness measurements

1. Learn how to use the hardness tester from the lab instructor.
2. Set the measurement scale to B for the aluminum, steel and stainless specimens.
3. After placing the specimen on the tester, ensure the minor load is set for the “R” scale.
4. Apply the major load of 100 kg for the aluminum specimen.
5. Record the hardness values.
6. Replace the indentor with the diamond intentor and set the secale to C
7. Repeat the measurments for the spring steel and pre-hardened specimens with the major load of 150 kg.
8. Record the hardness values.