
بسم الله الرحمن الرحيم

Measurements and Metrology

Fayoum University

Faculty of Engineering
Industrial Engineering Dept.

Lecture (4)

on

Surface Finish Measurement

By

Dr. Emad M. Saad

Industrial Engineering Dept.
Faculty of Engineering
Fayoum University

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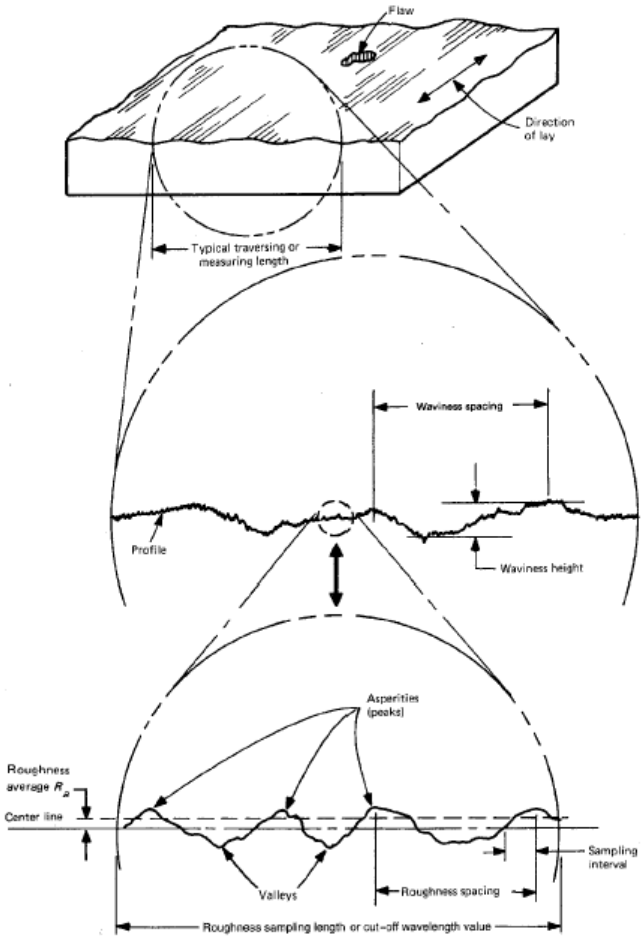
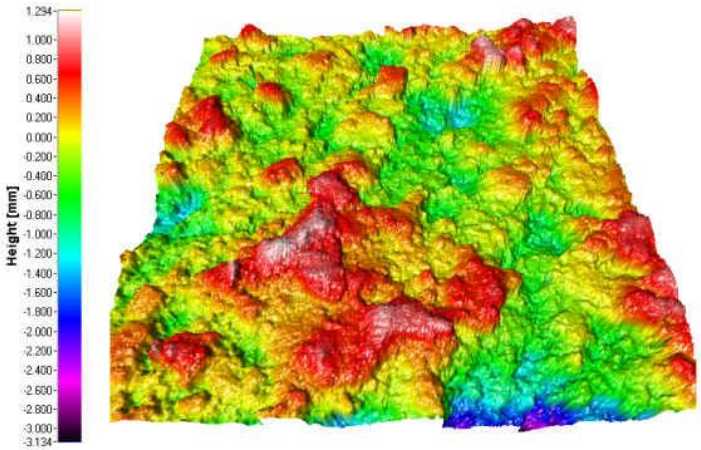
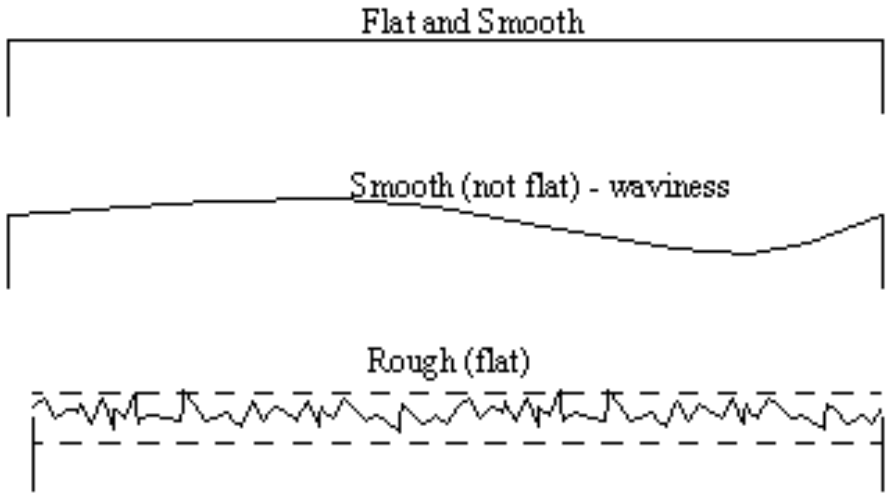
Surface Finish Measurement

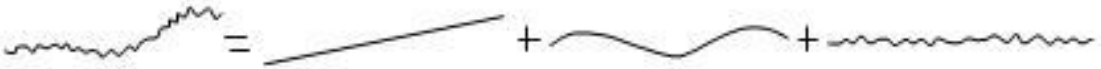




Surface Finish Measurement

Surface geometry can be quantified a few different ways.





Surface Roughness

When we are producing components by various methods of manufacturing process it is not possible to produce perfectly smooth surface and some irregularities are formed. These irregularities are causes some serious difficulties in using the components. So it is very important to correct the surfaces before use.

The factors which are affecting surface roughness are:

1. Work piece material
2. Vibrations
3. Machining type
4. Tool and fixtures

Surface Geometrical Irregularities

The geometrical irregularities can be classified as

First order irregularities

These are caused by lack of straightness of guide ways on which tool must move.

Second order irregularities

These are caused by vibrations

Third order irregularities

These are caused by machining.

Fourth order irregularities

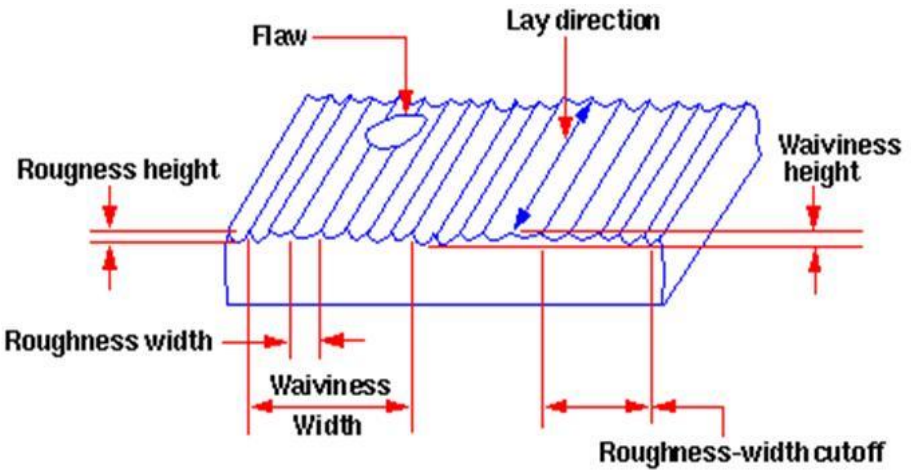
These are caused by improper handling machines and equipments.

Elements of surface texture

Profile: Contour of any section through a surface.

Lay: Direction of the 'predominate surface pattern'

Flaws: Surface irregularities or imperfection, which occur at infrequent intervals.



Surface characteristics (Courtesy, ANSI B46.1 - 1962)

Actual surface: Surface of a part which is actually obtained,

Roughness: Finely spaced irregularities. It is also called primary texture.

Sampling lengths: Length of profile necessary for the evaluation of the irregularities.

Elements of surface texture

Waviness: Surface irregularities which are of greater spacing than roughness.

Roughness height: Rated as the arithmetical average deviation.

Roughness width: Distance parallel to the normal surface between successive peaks.

Mean line of profile: Line dividing the effective profile such that within the sampling length.

Centre line of profile: Line dividing the effectiveness profile such that the areas embraced b profile above and below the line are equal.

Analysis of Surface Finish

The analyses of surface finish being carried out by

1. The average roughness method.
2. Peak to valley height method
3. From factor

Average roughness measurement

The assessment of average roughness is carried out by

1. Centre line average (CLA).
2. Root mean square (RMS)
3. Ten point method