Engineering drawing

Semester I/II

Mechanical Engineering Department
Technical University of Gdańsk

Lecture 5/6

Drawing standards - Drawings types

- Sketch
- Diagram
- Drawing

Assembly drawing

Working drawing (workshop drawing)

Working drawings

Working drawing is a drawing of machine part that includes all information necessary to manufacture this part, namely:

- the shape of part given by necessary number of views and sections drawn in proper standardized scale and proper line thickness;
- all necessary dimensions and tolerances;
- information about surface finish;
- other necessary information concerning heat treatment, material, number of parts and so on.

1923,0.SLDPRT

Working drawings

All working drawing sheets have to be provided with frame and title block placed at right lower corner.
The arrangement of views on drawing sheet shall be done and proper standardized scale selected.

Arrangement means that the number of necessary views and sections and its locations on a sheet have to be considered. The location is very important as well where proper space between views and frames shall be provided for dimensioning.

1923,0.SLDPRT

Assembly drawings

An assembly drawing is designed to show how to put all machine or steel structure parts together and to show what parts the machine consist of.

In the assembly drawing all parts of an arrangement and their relative locations should be shown.

The parts should be marked by numbers and described in Title-Block special for the assembly drawing.

There should be included such information as mark, number, name and material of parts. If a part is standardized the name and appropriate symbols should be written.

The main dimensions of an arrangement should be given only (overall dimensions)

005-105.SLDASM

Drawing standards – sheet formats

- There exist standardized sheet formats for creating engineering drawings.
- American National Standard
  - A - 8.5″ x 11″
  - B – 11″ x 17″
  - C – 17″ x 22″
  - D – 22″ x 34″
  - E – 34″ x 44″
- International Standard ISO (mm)
  - A4 – 210 x 297
  - A3 – 297 x 420
  - A2 – 420 x 594
  - A1 – 594 x 841
  - A0 – 841 x 1189

Use of scales

Scaling is used to depict objects on paper that are either larger or smaller than the paper.

A : B

Page : Object

The number on the left of the colon indicates the units on the Page.

The number on the right of the colon indicates the Units on the Object

Title - Blocks

Wstęp2.pdf
1937,0.SLDPRT
005-105.SLDASM

Type of lines

Continuous line (thick)

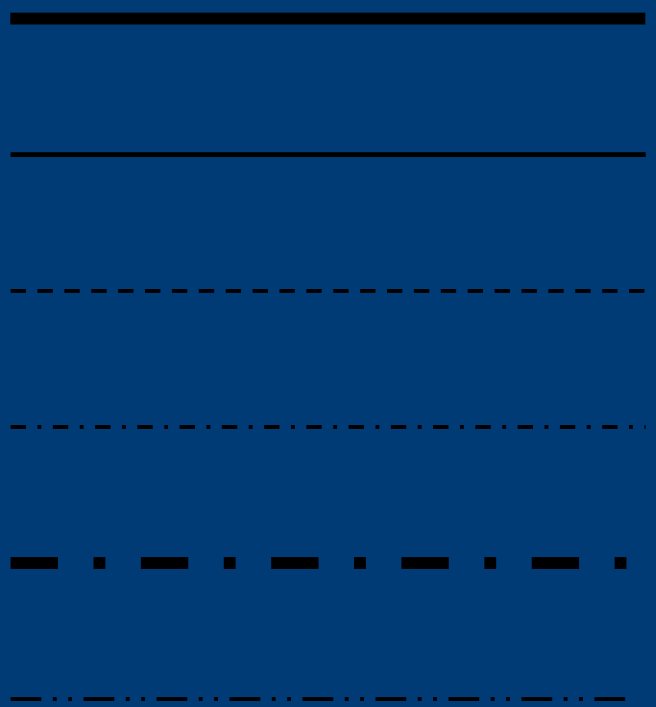
Continuous line (thin)

Dash line (thin)

Dash line with point (thin)

Dash line with point (thick)

Dash line with two points (thin)



Engineering drawing principles of representing elements in orthographic projection

- An element that is to be drawn has to be placed inside of imaginable cuboid in special way. It means that most of its characteristic surfaces and axes should be parallel or perpendicular to one of the principal plane.Detal1.SLDPRT
- The front view should show an element in work or machining positions. The front view should show maximum details of element. 1953,0.SLDPRT
- An element has to be represented in minimum number of views assuring univocally its shape and dimensioning possibility. Projections can be views, sections, half-views or half-sections, auxiliary views and so on.2312,0.SLDPRT Detal3.SLDPRT

Basic principles

- **Outline and edges**

  Visible outline and edges are represented by means of thick line. Hidden lines by means of thin intermittent lines.Detal4.SLDPRT Detal5.SLDPRT
- **Rounding of passes between surfaces (rounds)**

  Rounds are not drawn generally, nevertheless to increase an element expressiveness, they are marked by means of not full length thin lines. Detal6.SLDPRT
- **Symmetry marking**

  Symmetry of an element is marked by means of thin point lines. Symmetrical element can be represented in half view or in a quarter view and in section as well. In such case it has to be stressed that a view is simplified (equality mark) Detal7.SLDPRT 1923,0.SLDPRT 1836,0.SLDPRT

Basic principles

- **Small taper and slope of surfaces**

  Small tapers (convergences) are to be drawn exaggeratedly. In a view they are drawn by means of one line only.Detal8.SLDPRT Detal9.SLDPRT
- **Characteristic positions of an element**

  If there is necessity of representing a characteristic position of an element, it is drawn by means of two point lines.Detal10.SLDASM
- **An element braking**

  In case of application of an auxiliary view, a shown element can be broken (shortened).

Basic principles

- **Projection breaking**

  A projection breaking has application when an element is too long but its shape is univocal.Detal12.SLDPRT
- **Flat surfaces representing**

  To make a view of an element with flat surfaces more clear thin diagonal lines are drawn (it has not application for a hexagonal shapes).Detal13.SLDPRT
- **Repeating elements of an object**

  When one element repeats for an object, only one element can be drawn.

Views

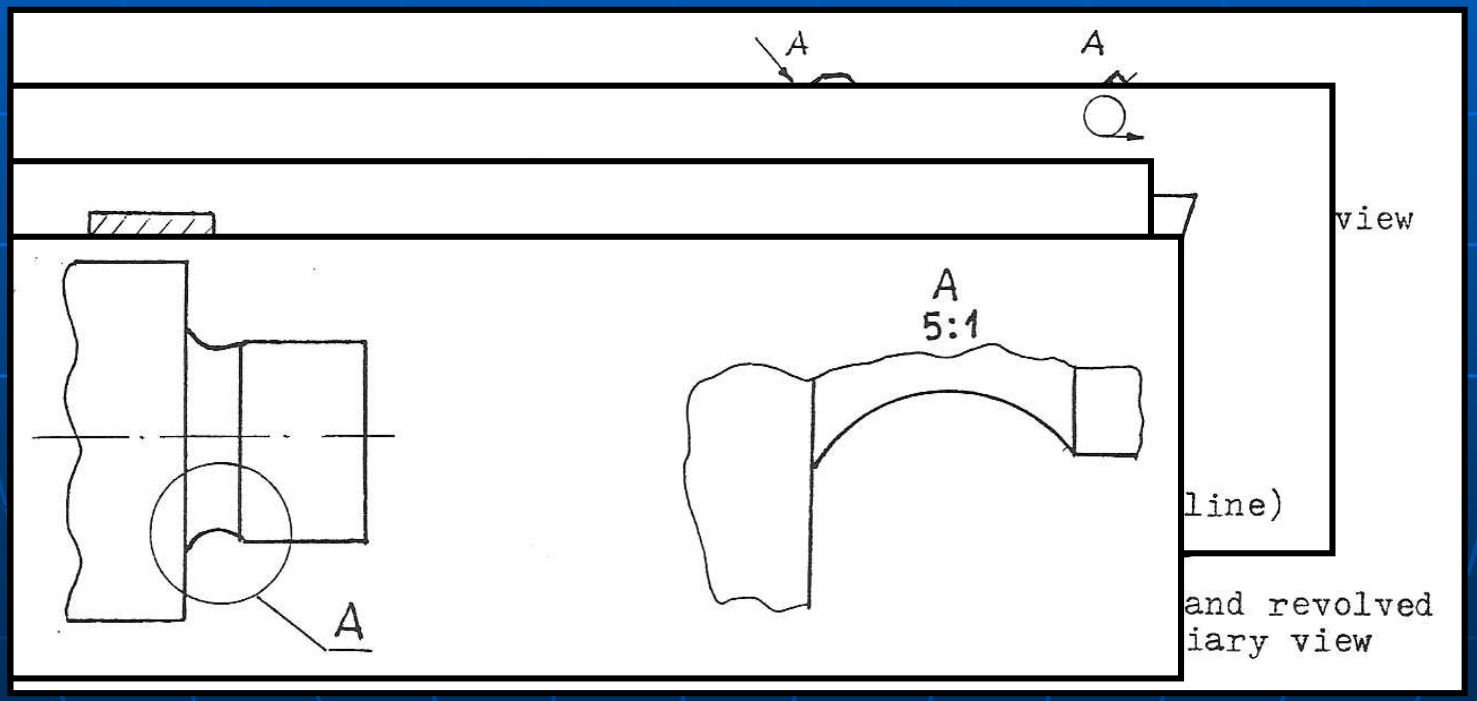
The first angle system has application in Europe. It is called European System „E” where views are not marked. Accordingly polish standards the third angle system called American System, has to be marked properly together with projecting direction.

Detal14.SLDPRT

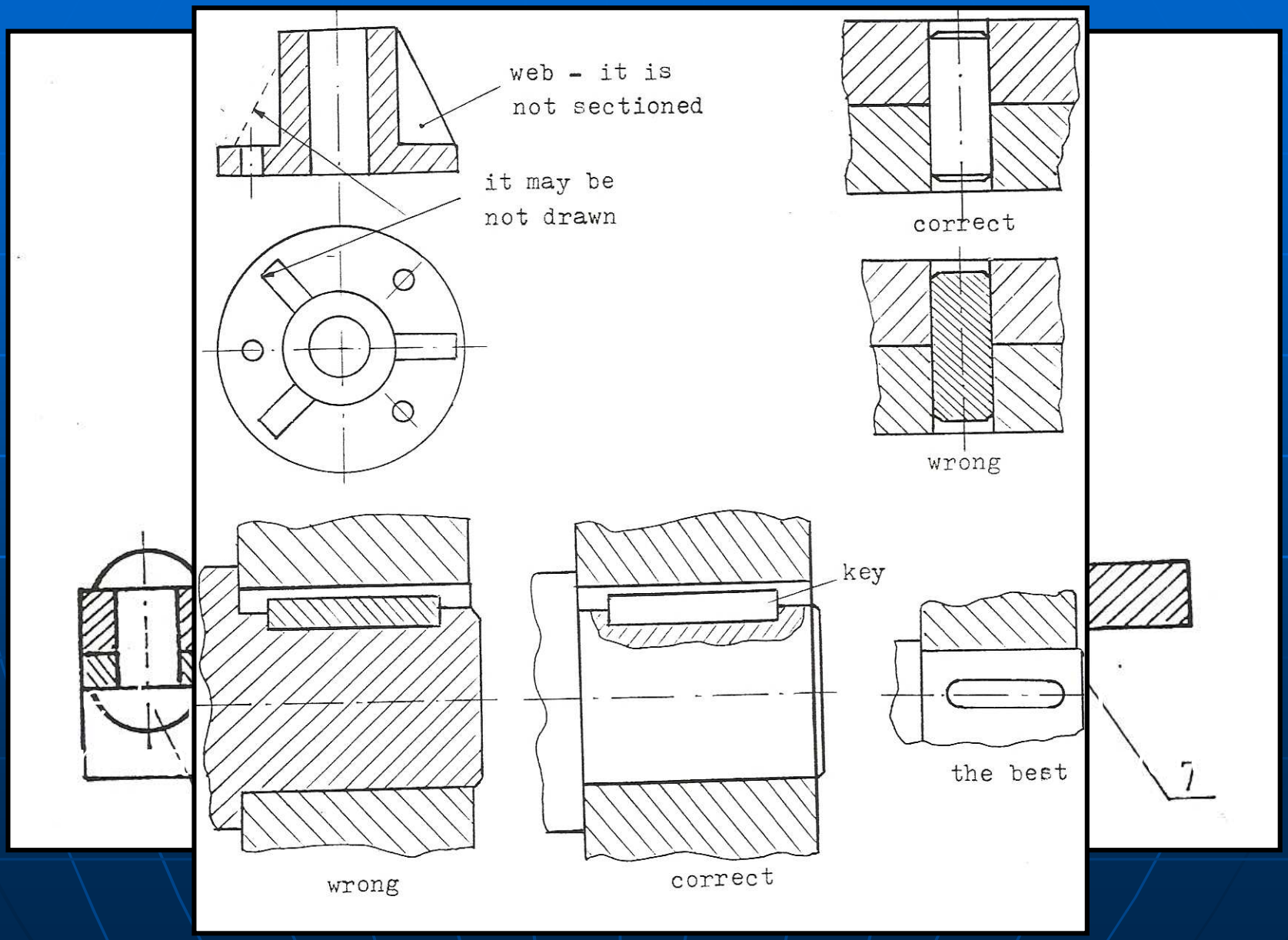
Views

View types:

- normal view
- auxiliary view
- shifted auxiliary view
- shifted and revolved auxiliary view Detal15.SLDPRT



Sections


web - it is
not sectioned
it may be
not drawn
correct
wrong
key
wrong
correct
the best
7

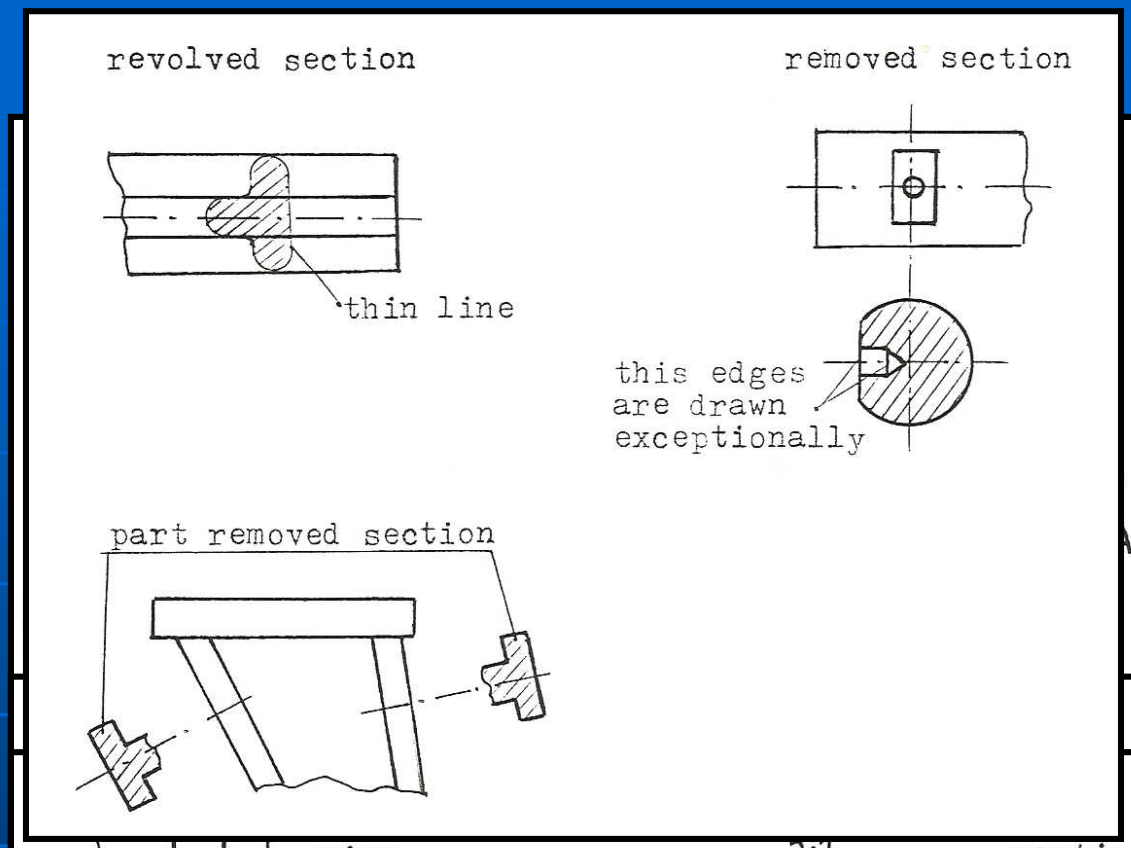
Marking of sections

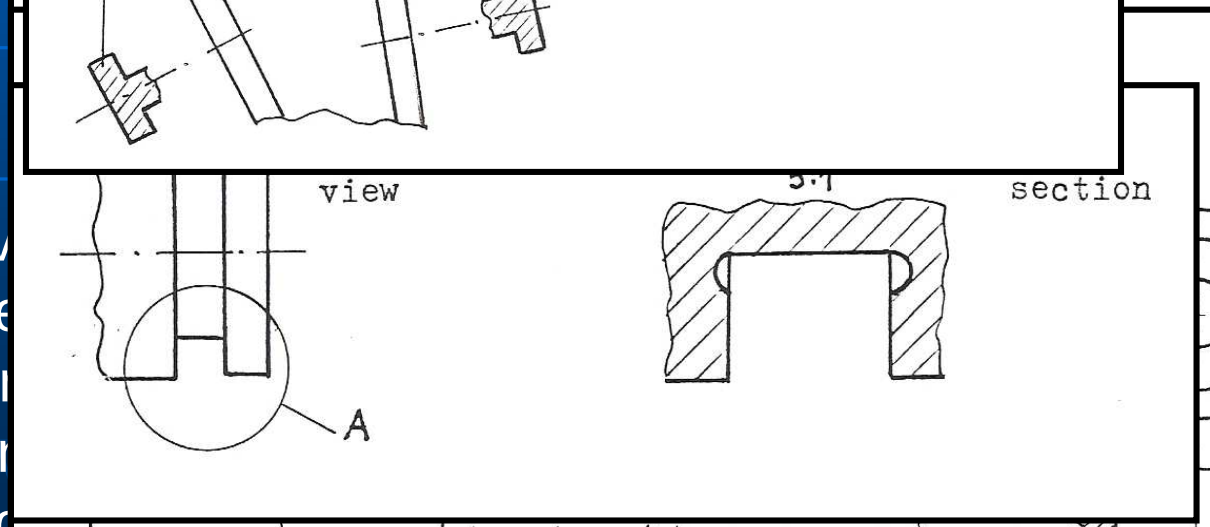
Sectioning planes are marked by means of two placed out of element short thick lines and a capital letter. Arrows show projecting direction.

Exceptions:

- sectioning plane is not marked if it goes through main axis of an element;
- sectioning plane is not marked if the section is drawn in first angle system „E”, it is the only section and it is situated on a side of view.

Do not use letters: I, O, Q, R, X for section marking!





Revolv e of a
symme ssible
false i r thin
horizon in left
directi ection.
A secti