

GRAPHIC EDUCATION/COMMUNICATION IN SECTIONAL VIEWS

Abstract: The importance of graphic communication is evidently comparing it with word language. To describe in words a technical drawing is not an easy work, but knowing methods, principles, rules and symbols you may understand it as a graphic communication. Engineering is applied science and graphic communication must be complete and accurate. Of course, the written word completes many descriptions. But whenever pieces, structures and surfaces are designed, described and built, graphic representation is necessary. A good representation means a clear graphic education. Graphic communication is about a language of engineering graphics.

Key words: graphic education/communication, graphic representation, language, sectional view.

1. INTRODUCTION

A drawing is a graphic representation of a real thing, an idea, or a purposed design for later manufacture or construction. Drawings may take various forms, but graphic method of representation is a basic natural form of communication of ideas that is universal and timeless in character [3]. This graphic language—the representation by drawings—has been developed in two directions according to the purpose: artistic and technical.

Frequently is necessary to show more or less concerning the interior of machine parts that cannot be shown clearly by means of hidden lines. To make a sectional view, a cutting plane is assumed to be passed through the part for the design. The cutting plane is removed and the two halves drawn apart, exposing the interior construction. If the cutting plane passes halfway through the object, the result is a half section.

This half section has the advantage of exposing the interior of one half of the object and retaining the exterior of the other half.

This kind of cutting (section) is useful in assembly drawing in which is often necessary to show both internal and external construction on the same view.

Knowledge of the methods and procedures formatting working drawings is absolutely necessary for anyone involved in the design and production of machines and structures. The principles of graphic communication are essentially the same throughout the world and that is why is easy for somebody, having technical education, to understand an engineering drawing.

2. CONSIDERATIONS

The engineering education means:

- graphic education;
- graphic representation;
- graphic communication.

Its basis contains methods, rules, principles, symbols in accordance to domestic and international standards. This engineering education follows a direction to achieve a purpose. And this purpose is to have a very clear drawing, to understand it.

3. EDUCATION AND COMMUNICATION IN ENGINEERING GRAPHICS IN THE FIELD OF SECTIONAL VIEWS

To build a program of graphic education and/or communication we can choose two directions of study:

- a) going from 3D representation to obtain a 2D representation;
- b) going from a 2D representation to obtain a 3D representation.

a) First direction is easier because we have a clear image of the machine part and, in the same time, is not so heavy to use cutting planes to achieve sectional views.

Applying technical drawing rules we realize a 2D representation. Figures 1, 2 and 3 are suggestive in this way.

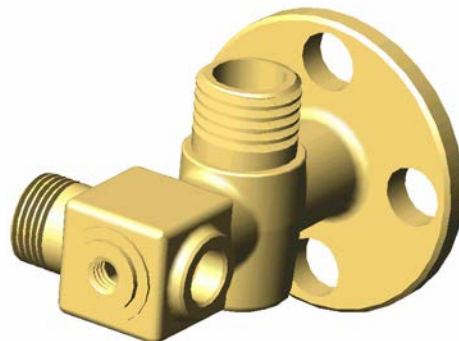


Fig.1 Complex tubes joint.

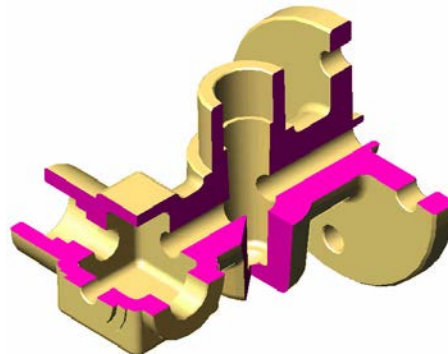


Fig.2 Multiple sections through part above.

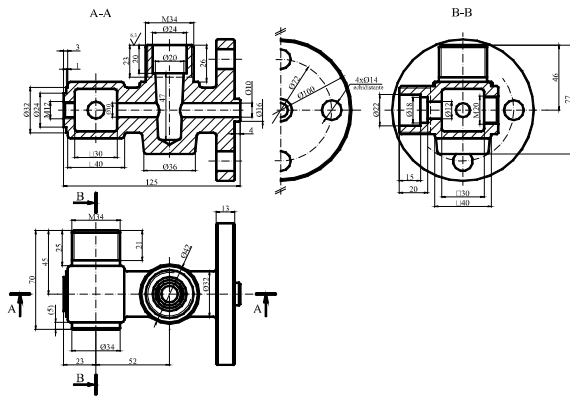


Fig. 3 2D representation

All these 3D representations of different pieces can represent a collection into a basis of models for a lot of users. See Table 1.

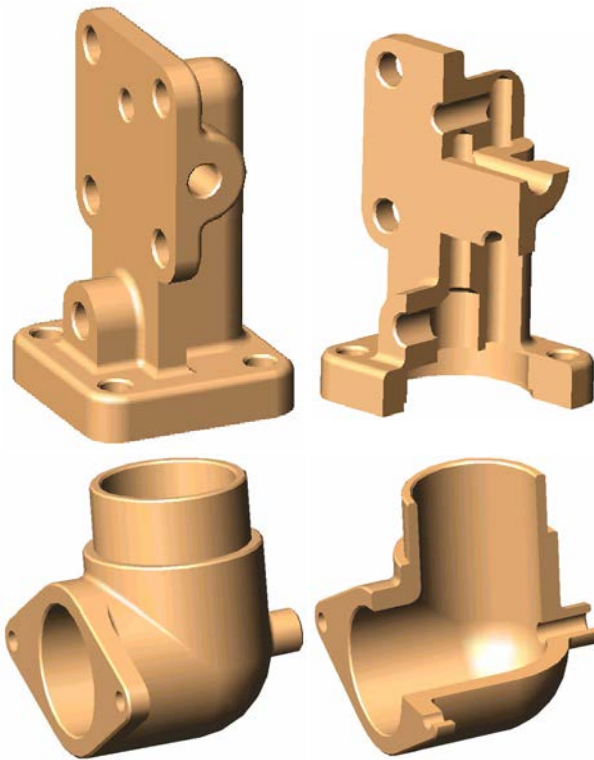
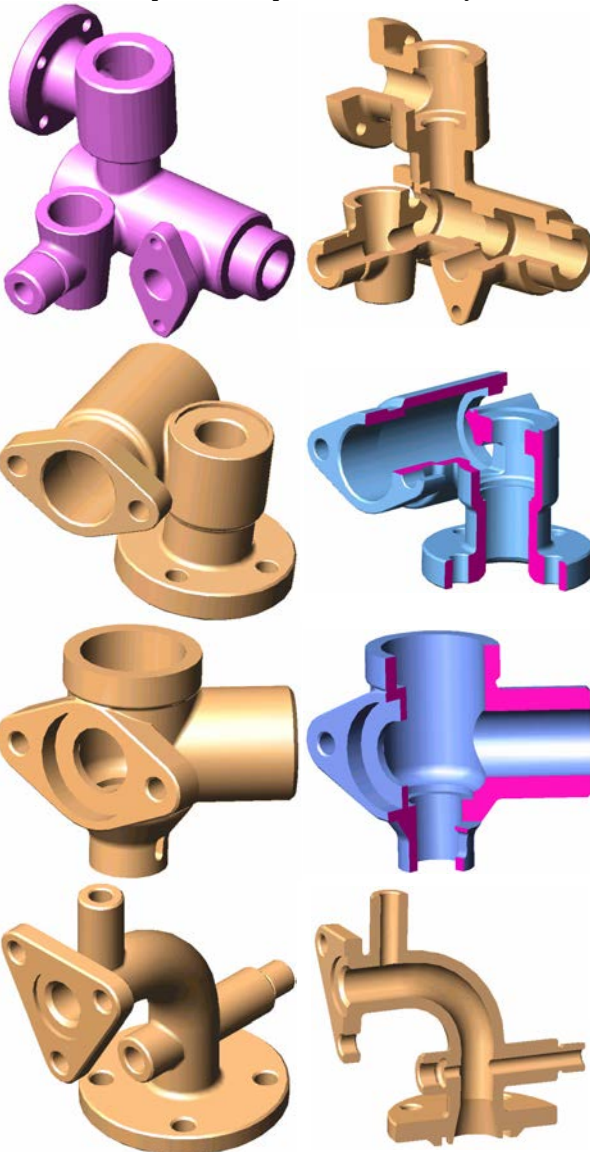


Table 1

A few examples of 3D representation to study.



b) The back way from 2D to 3D drawing asks for a special attention concerning technical and graphical knowledge. Also, for students, it is necessary to develop a very good collection of models to study. Figures 4 and 5 are suggestive to this purpose.

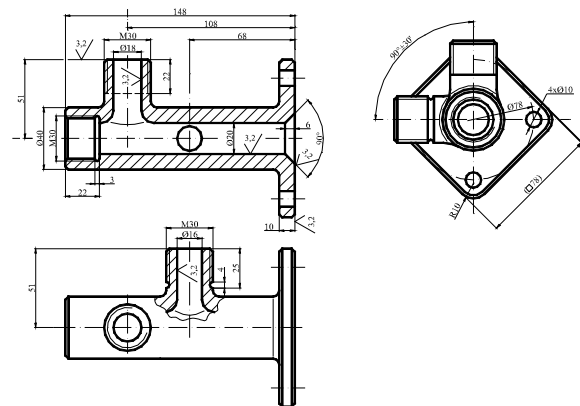


Fig. 4 2D representation.

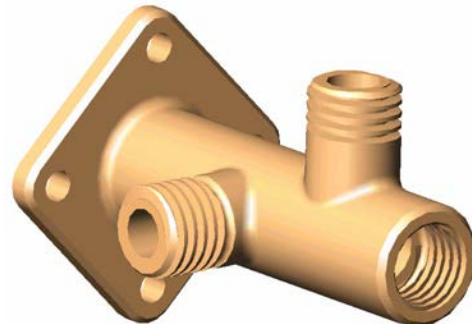


Fig. 5 Complex fitting

Also, to accommodate the students with the assembling of parts, it is useful to create a collection of fitting assemblies to study, like in tables 2 and 3.

Table 2

Examples of assembling parts.

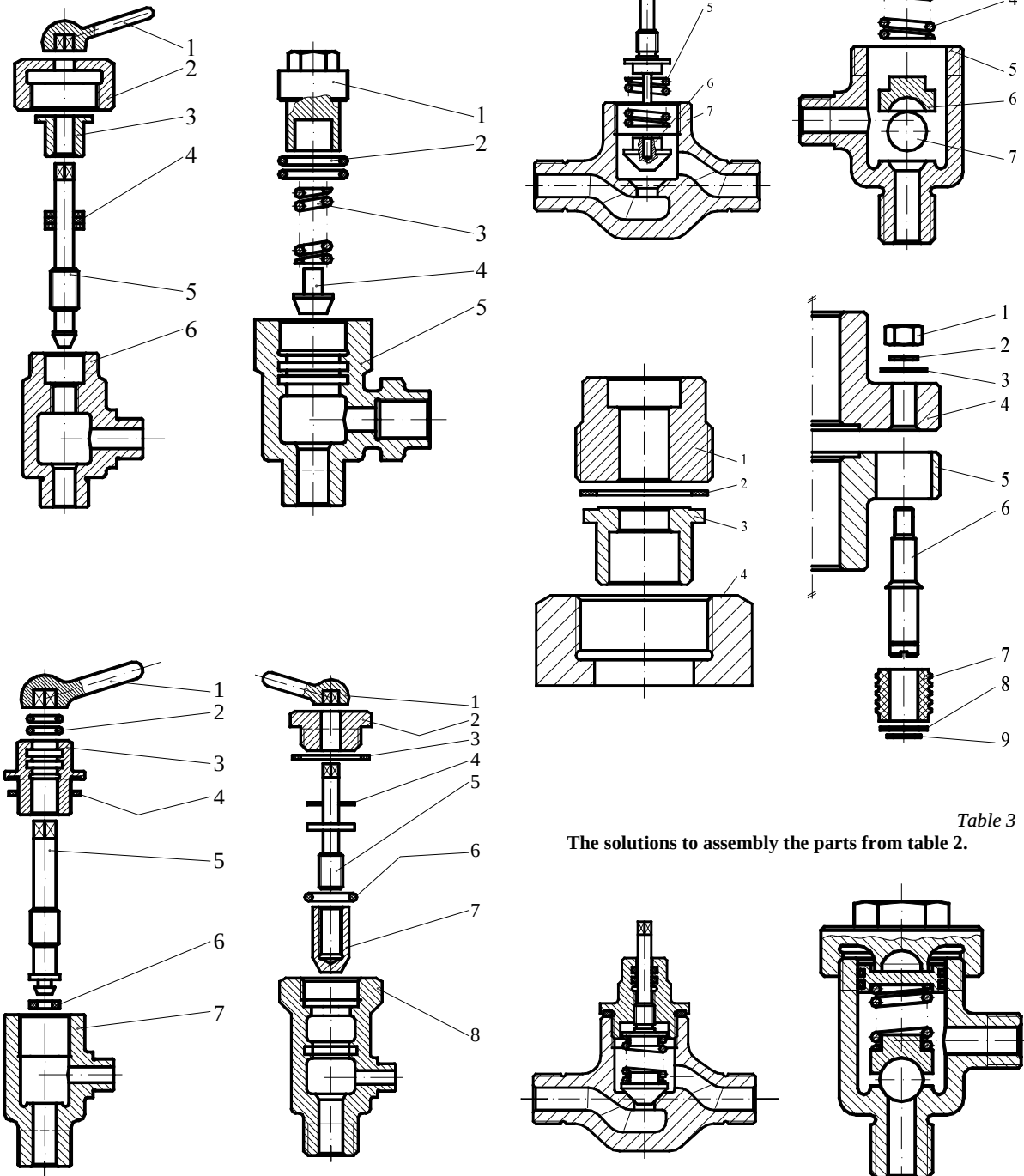
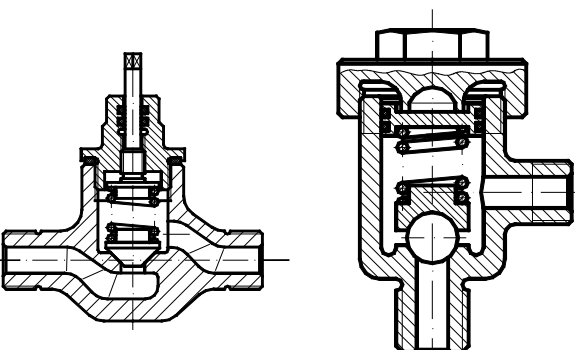
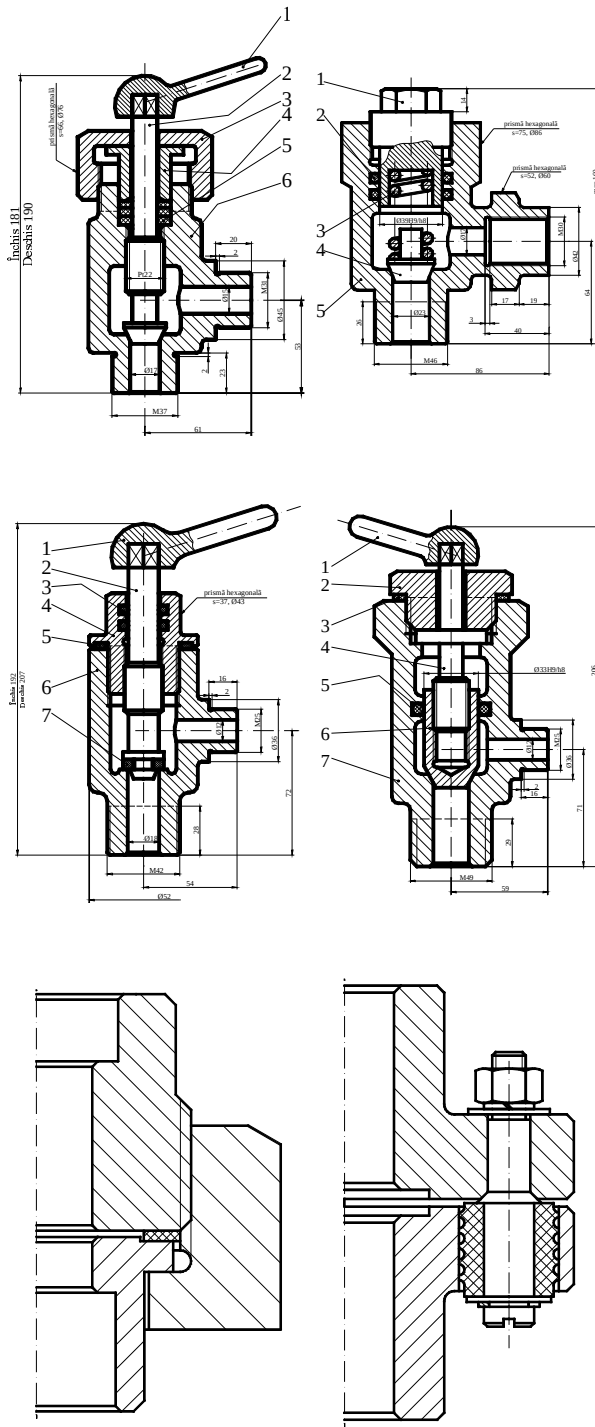


Table 3
The solutions to assembly the parts from table 2.





4. CONCLUSIONS

The engineering education as a graphic communication is very important in technical studies.

This kind of communication can be developed into an efficient, captivating and modern spirit. Having a lot of models, every user can perform more than one, some of machine parts being a true graphic challenge.

The purpose of this graphic education/communication is to achieve a durable knowledge and, of course, to open a very good channel in graphic communication.

Sometimes, to describe technical objects with word language is a big problem. Is easier for engineers to represent shape and relative size of objects because they know technical drawing and they know to communicate between them in a graphic representation. The language of engineering graphics means, also, accepted conventions and abbreviations. Because its principles are essentially the same throughout the world, a person trained in this practice can readily adapt to the practice of another.

We are positive sure that a rough draft of graphic education/communication is necessary in engineering education, to obtain better results and better specialists.

5. REFERENCES

- [1] Adîr, V., Pavel, A., Adîr, G., Adîr, A. (2004). *Geometrie Descriptivă și Grafică Inginerească*, Printech Publishing House, ISBN 973-718-069-0, București, România.
- [2] Adîr, V., Pavel, A. (2003). *Desen Tehnic*, Bren Publishing House, ISBN 973-648-124-7, București, România.
- [3] Giesecke, F., E., Mitchell, A., Spencer, H., C., Hill I., L., Dygdon, J., T. (1986). *Technical Drawing*, Macmillan Publishing Company, ISBN 0-02-342600-4, New York, USA.
- [4] French, T., E., Vierck, Ch., J., Foster, R., J. (1984). *Graphic Science and Design*, McGraw-Hill Book Company, ISBN 0-07-022307-6, USA.
- [5] Adîr, V., Adrian, P. (2003). *Utilizarea computerului în secționarea pieselor de tipul armăturilor*, Proceedings of the 8th National Symposium (international participation)–Technical Graphics and Design 2003, University Transilvania Publishing House, pp.9-12, ISBN 973-635-195-5, june 2003, Brașov, România.

Authors:

Eng. **Victor ADÎR**, Ph.D., associate professor, University POLITEHNICA of București, e-mail victoradir@yahoo.com;

Eng. **George ADÎR**, Ph.D., associate professor, University POLITEHNICA of București;

Eng. **Adrian PAVEL**.