

UDC 621.01

**THEORY OF LOCATION DURING ASSEMBLY
ТЕОРИЯ БАЗИРОВАНИЯ ПРИ СБОРКЕ**

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Key words: location in the assembly, the methods of location, the problem of location.

Ключевые слова: базирование при сборке, методы базирования, проблемы базирования.

Abstract. Methods of location during assembly, the methods of location, the base part, and the assembled elements are considered in the article.

Аннотация. В статье рассмотрены методы базирования при сборке, способы базирования базовой детали и собираемых элементов.

Assembly is the final stage of manufacturing machines and mechanisms, which largely determines the operational reliability and durability of the product. The volume of assembly work at the current level of engineering production is significant and amounts to a total labor input of manufacturing the product: in mass and large-scale production 20 ... 25%, in the serial production - 25 ... 35%, in single and small-lot production - 40 ... 50%.

In various branches of machine building, the share of assembly works varies. For example, in heavy machine building, the laboriousness of assembly is 30-35% of the total laboriousness of manufacturing a product, in machine tools 25-30%, in the automotive industry 18-20%, in instrument engineering up to 45%. [1, p.209] Therefore, the acceleration of the assembly process is extremely important.

According to GOST Assembly - the formation of connections of the component parts of the product. The essence of the assembly consists in the consecutive connection and fixation of all the parts that make up this or that assembly unit in order to obtain a product meeting the technical requirements established on it. [2]

The assembly process of the product follows the assembly process. The assembly as technological process is a part of the production process, directly connected with the joining of parts in certain technologically and economically expedient sequence for the production of assembly units and products fully satisfying the requirements established for them.

The assembly process consists of a series of operations to connect the conjugate parts to the nodes, and knots to the machine. [1, p.212]

There are several common methods of assembly:

1. assembly by the basic part (drawing);
2. assembly by marking;

3. assembly by the assembly holes;
4. assembly using special assembly tools.

Assembly by the basic part – is used in the case when the assembled parts have a great deal of their own rigidity, and the dimensions of the finished product are provided by the system of tolerances and landings adopted in the general engineering industry. When assembling nodes from parts with low stiffness by this method, its realization is difficult to implement.

Assembly by marking – requires the mandatory presence of one such part in the assembled product, which could serve as the main (base) and on which it is possible to apply marking lines to other parts that are interfaced with it. In this case, universal tools and tools (clamps, dies, cores, compasses, etc.) are used. The details are marked by hand.

Assembly by the assembly holes – a process in which the relative location of assembled parts is determined by the position of the assembly holes available on them.

Assembly with the use of special assembling devices is the most popular way of assembling during mass production. Assembling devices provide the required relative positioning of the assembled parts, tools, shaping of insufficiently rigid parts and assemblies during assembly. [3]

Each of the assembly methods includes the installation of the part (location), its fixing and connection. The assembly of the part is done by assembly bases.

Assembly bases are called bases, which determine the position of this part in the assembly unit and in the complex. These are the supporting and mating surfaces of the base and hull parts, the grooves in the shafts, and so on. [4]

In most cases, the assembly begins with the base part. The base part is installed and fixed first, has well-defined base surfaces, ensuring its stable position during assembly. The largest overall dimensions in comparison with the parts that are mounted on it. To perform this task, the theory of location in machining is applicable. The main difference is that we take into account the forces that arise when joining elements to the base part, and not the forces that arise during its processing.

Depending on the type of the base part, the methods of location differ. Basically, the base part has flat or cylindrical surfaces less often spherical and shaped. In the case of a flat base surface, the best way is to use a kit with an installation base (Figure 1).

For basic parts with a cylindrical shape, it is rational to use a set of bases with a double guide (Figure 2).

For basic parts with a spherical surface, a set of bases with a triple guide is used.

After the main part is based, the elements attached to it are based. The assembled parts can be based both on mating surfaces and on auxiliary surfaces. At the same time, the cylindrical, flat, threaded, conical and combined surfaces are the most used for location. Spherical, core and knife surfaces are used less often.

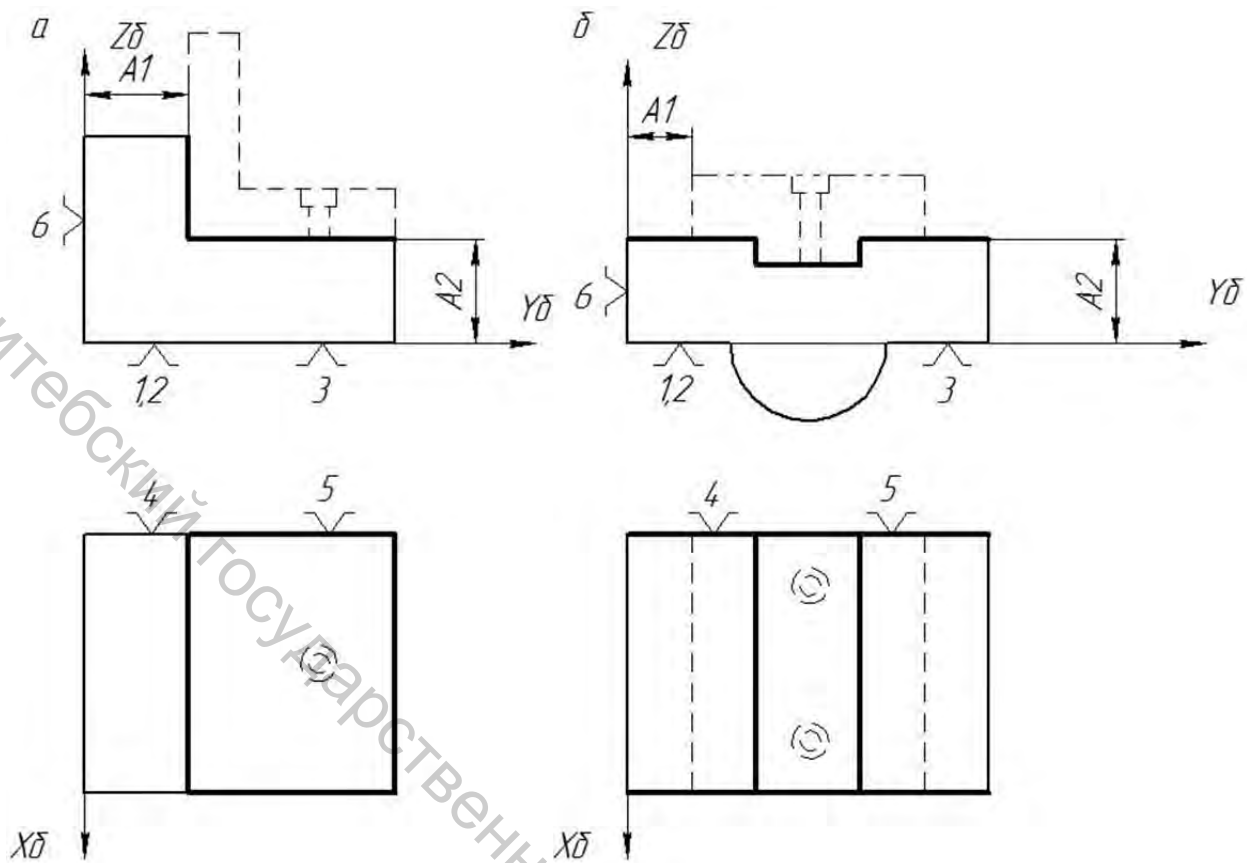


Figure 1 – assembling location, a base part with a flat surface

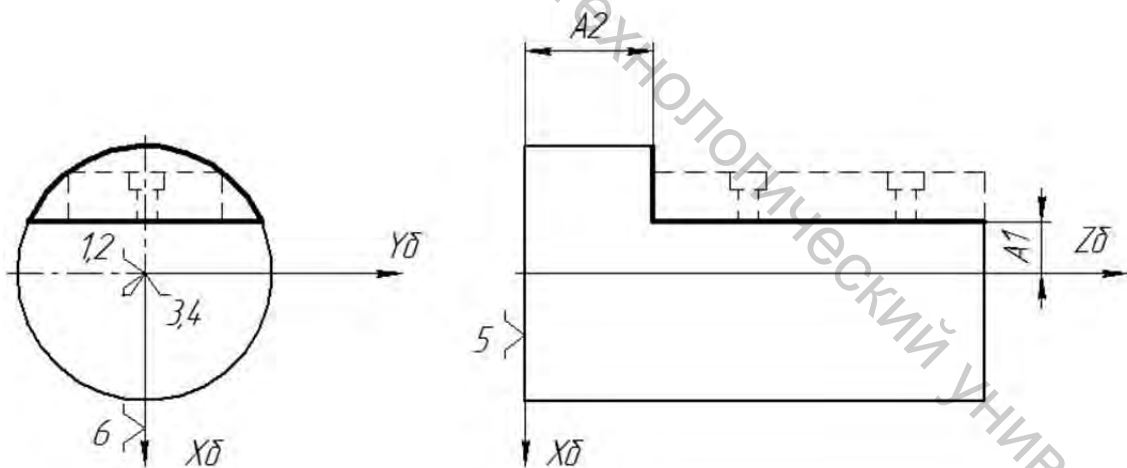


Figure 2 – assembling location, a base part with a cylindrical surface

The simplified assembling location algorithm looks like this:

- 1) Location of the base part taking into account the sizes and tolerances to the joining surface of the elements of the assembly.
- 2) Determination of the type of surface in the place of attachment of the next element of the unit, the requirement for precision of joining parts and the need for the use of assembly equipment.

3) The basis of the attached element, taking into account the specificity of the fixation (bolted connection, welding, etc.)

At the moment, an extended classification of the correspondence of the attachment surfaces of the set of bases and the applied assembly devices is being developed.

References

1. Акулич, Н.В. Технология машиностроения: учебное пособие / Н.В. Акулич – Гомель, 2008. – 270с.
2. Сборка (техника) [Электронный ресурс], режим доступа: [https://ru.wikipedia.org/wiki/Сборка_\(техника\)](https://ru.wikipedia.org/wiki/Сборка_(техника)) – Дата доступа: 10.09.2017.
3. Методы сборки и сборочные базы [Электронный ресурс], режим доступа: <http://studopedia.org/4-63637.html> – Дата доступа: 10.09.2017.
4. Кох, П.И. Производство, монтаж, эксплуатация и ремонт подъемно-транспортных машин / П.И. Кох. – Киев: изд-во «Висшая школа», 1977. – 352 с.

UDC 675.92.01

THE STRUCTURE AND PROPERTIES OF ARTIFICIAL LEATHER СТРУКТУРА И СВОЙСТВА ИСКУССТВЕННОЙ КОЖИ

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Key words: artificial leather, natural leather, footwear, physical–mechanical properties, quality.

Ключевые слова: искусственная кожа, натуральная кожа, физико-механические свойства, качество.

Abstract. Nowadays, artificial leather is often used in footwear manufacture. The article presents the results of the study of physical and mechanical properties of the artificial leather in comparison with natural leather.

Аннотация. В настоящее время искусственную кожу часто применяют в производстве обуви. В статье представлены результаты исследования физико-механических свойств искусственной кожи в сравнении с натуральной кожей.

Artificial leathers are becoming popular as an alternative material owing to limited availability of natural leathers. This material is multilayered and composite. Artificial leathers are generally produced by coating PU over a base fabric, which generally comprises woven or knitted fabric made of synthetic fibers and forming open cells to maintain air permeability. PU is a polymer compound that has a urethane bond (-