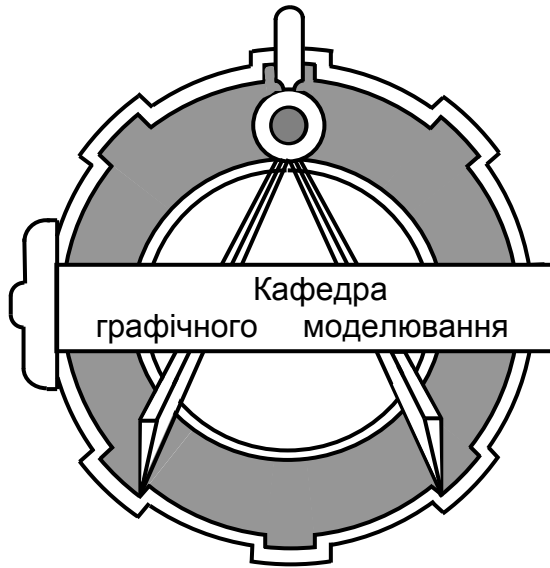


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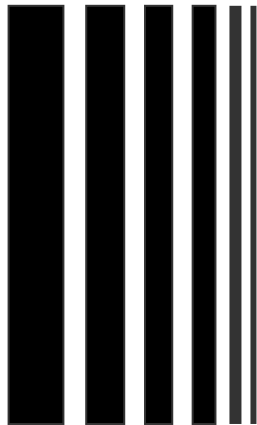
ТЕРНОПІЛЬСЬКИЙ НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ  
ІМЕНІ ІВАНА ПУЛЮЯ

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**ВИКОНАННЯ  
ПЛАНІВ  
БУДІВЕЛЬ**



**МЕТОДИЧНІ ВКАЗІВКИ  
ТА ЗАВДАННЯ ДО ВИКОНАННЯ  
ГРАФІЧНОЇ І САМОСТІЙНОЇ  
РОБОТИ  
ДЛЯ ІНОЗЕМНИХ СТУДЕНТІВ  
НАПРЯМУ "БУДІВНИЦТВО"  
З КУРСУ «ІНЖЕНЕРНА ГРАФІКА»**

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**Тернопіль  
2015**

УДК 744  
ББК 38.2  
В43

Укладачі:

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За редакцією:

*Денисюк Н.Р.*, канд. філол. наук, доцент.

Рекомендовано й затверджено на засіданні кафедри графічного моделювання  
Тернопільського національного технічного університету імені Івана Пулюя  
протокол № 7 від 27.02.2015 р.

Схвалено та рекомендовано до друку методичною комісією факультету  
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технічного університету імені Івана Пулюя протокол № 4 від 05.03.2015 р.

Навчально-методичний посібник з курсу “Інженерна графіка” містить  
матеріали з будівельного креслення. Наведено основні вимоги, що ставляться  
до будівельних креслень, оформлення технічної документації. Подано  
необхідні відомості для виконання планів будівель, розрізів. Викладено правила  
оформлення зображень з урахуванням останніх вимог стандартів.

Призначено для студентів університетів, коледжів і технікумів  
стаціонарної та заочної форм навчання будівельних спеціальностей, які згідно з  
навчальними планами вивчають дисципліну “Інженерна графіка”. Приведено  
зміст графічної роботи з виконання плану будівлі та розрізу будівлі.

**В43** Виконання планів будівель: методичні вказівки та завдання до  
виконання графічної і самостійної роботи для іноземних студентів  
напряму «Будівництво» з курсу «Інженерна графіка» / Укладачі :  
Пік А.І., Скиба О.П., Денисюк Н.Р. – Тернопіль : Вид-во ТНТУ імені  
Івана Пулюя, 2015.-48с.

**УДК 744**  
**ББК 38.2**

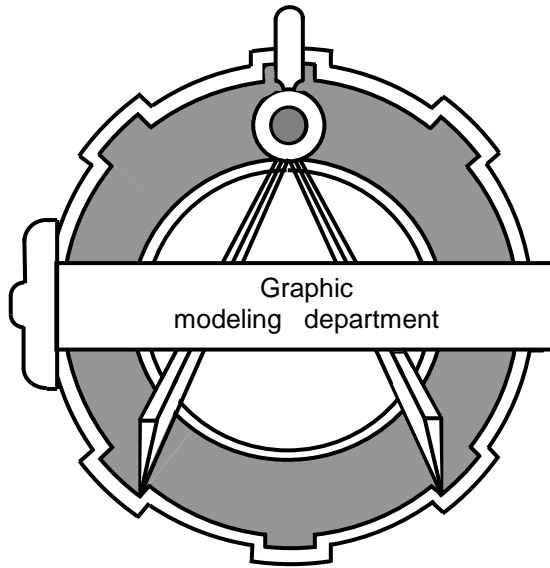
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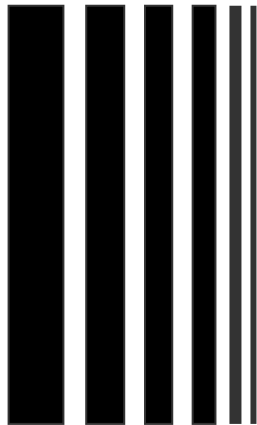
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**BUILDING  
PLANS  
EXECUTION**



**STUDY GUIDE  
AND TASKS TO EXECUTE  
GRAPHIC AND INDEPENDENT WORK  
FOR FOREIGN STUDENTS  
MAJORING IN "CONSTRUCTION",  
«ENGINEERING GRAPHICS» COURSE**

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**Ternopil  
2015**

Ministry of Education and Science of Ukraine  
Ternopil Ivan Pul'uj National Technical University

*Кафедра графічного моделювання*  
*Graphic modeling department*

**ВИКОНАННЯ БУДІВЕЛЬНИХ ПЛАНІВ**

BUILDING PLANS EXECUTION

**Укладачі: Пік А.І., Скиба О.П., Денисюк Н.Р.**  
Authors: Peak A.I., Skyba O.P., Denysiuk N.R.

**методичні вказівки  
та завдання до виконання  
графічної і самостійної роботи  
для іноземних студентів напрямку “будівництво”  
з курсу «інженерна графіка»**

Study guide

and tasks for students of all forms of training  
to perform graphic and independent work  
in “Engineering graphics” course  
for students majoring in “Construction”

**Тернопіль 2015**

Ternopil 2015

## 1. THE AIM OF THIS STUDY GUIDE

The aim of this study guide is to help study the theme “Construction Drawing” in the course “Engineering Graphics”. In spite of many common features with mechanical drawings, construction drawing is considered to be a separate and distinct section of engineering drawing, knowledge of which is necessary to any engineer of all specialties. Students must learn the conventions and characteristics of construction drawing in order to be able to make plans and sections of buildings as well as to read drawings of industrial and civil buildings and separate structural units.

## 2. MODULAR COORDINATION OF DIMENSIONS IN CONSTRUCTION

The basis of characterization and standardization of design, building products manufacture and construction itself is *a modular coordination of dimensions in construction* (MCDC), which is a collection of rules coordinating the dimensions of space-planning and structural elements of buildings and structures, building products and equipment based on the module.

*Module* is a standard unit of measurement used to coordinate the dimensions of buildings and structures, their components, parts and building products.

*Main module* is a module adopted as a basis for determining the others derived from modules. The value of the main module equals 100 mm and is denoted by M.

*Derived module* – integral or non-integral – is a module that is multiple to the main one or completes the part of it.

*Integral module* (multi-module) is a production module, which is larger than the main module an integer number of times: 3M, 6M, 12M, 15M, and 60M (accordingly 300, 600, 1200, 1500, 3000, and 6000mm).

*Non-integral module* (sub-module) is a derived module, which is smaller than the main module: 1/2M, 1/5M, 1/10M, 1/20M, 1/50M, and 1/100M (accordingly, 50, 20, 10, 5, 2, and 1mm).

*Space-planning element* is a part of a building that is characterized by the bearer, step, and height of a floor. Planning element is a horizontal section of space-planning element. The height of a building floor is determined by the distance from the platform level of the floor to the platform level of located above floor. Floor height in single-staged industrial buildings equals the distance from the floor level to the lowest level of load-bearing structure of a support.

Space-planning elements of buildings and structures are arranged in space by means of modular three-dimensional space coordinative system of modular plane. MCDC can use the orthogonal system (Fig. 2.1). The distance between these planes

is considered non-integral to the main and derived modules. Modular planes intersection lines are the modular coordination axes. These axes are drawn on the plane along the main load-bearing building constructions or structures. Coordination axes are used in construction during partitioning the structure on the ground.

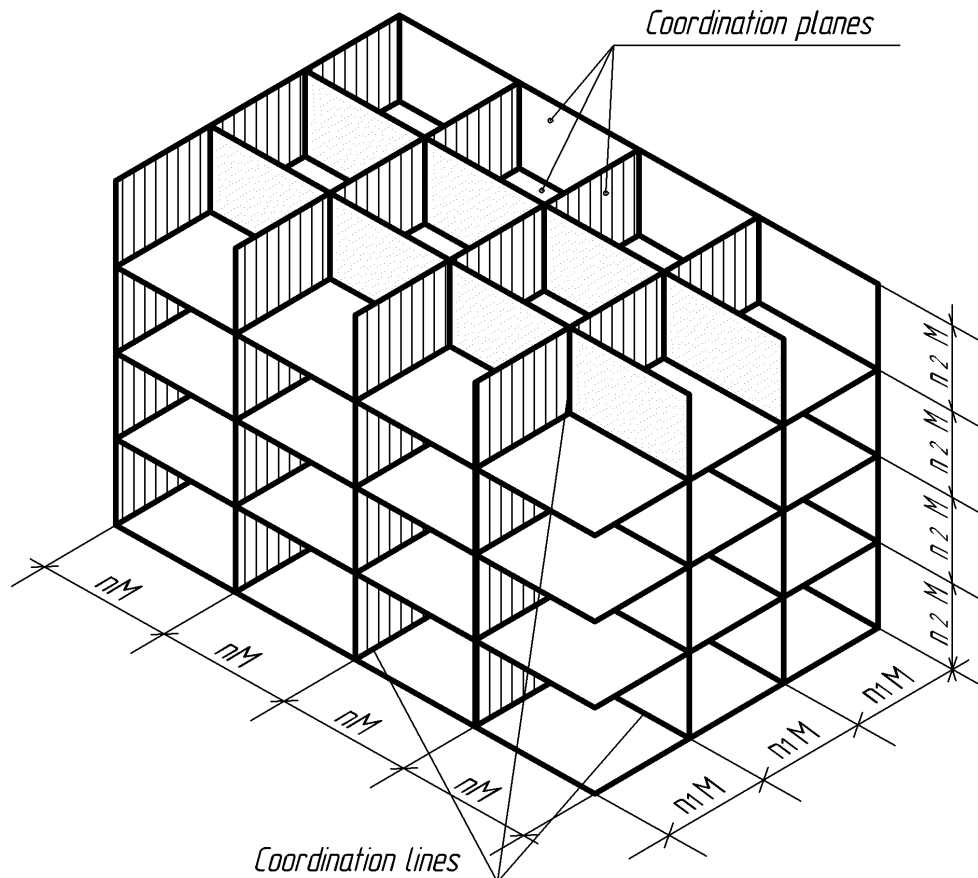


Fig. 2.1. Coordination system of modular planes

The distance between coordination (partitioning) axes in a plan is called a step. Step can be longitudinal and transverse. The distance between coordination axes in the direction that fits the bearer of the main load bearing floor system (bearer, cross-beam) can coincide with a step (Fig. 2.2).

### 3. GENERAL RULES OF CONSTRUCTION DRAWINGS GRAPHIC DESIGN.

#### 3.1. Dimensions

The dimensions in construction drawings are put down in accordance with All Union State Standard 2.307 - 68 with regard to the requirements of design

documentation system for construction - Ukrainian national standardization system BA. 2. 04/07/95 (AUSS 2.501 - 93). Dimensions are put down in millimeters without indicating the units of measurement and usually in the form of a closed circuit. To put the dimensions in other units (cm, m), it is necessary to make special notes in the drawing. Dimensional lines are limited not by arrows, but ticked lines (Fig 3.1). Ticked lines are the short dash marks with the length 2 – 4 mm; they are done at the angle of right inclination  $45^\circ$  to the dimensional line. Ticked line thickness equals the thickness of solid main line adapted to this drawing. Dimensional lines should be extended over extreme extension line 1 - 3 mm. Dimensional value is put above the dimensional line at approximate distance from 0.5 to 1 mm. Extension line can be extended over the dimensional one from 1 to 5 mm. If there is a shortage of space for ticked lines on the dimension line, which is a closed circuit, the ticked lines can be replaced by dots.

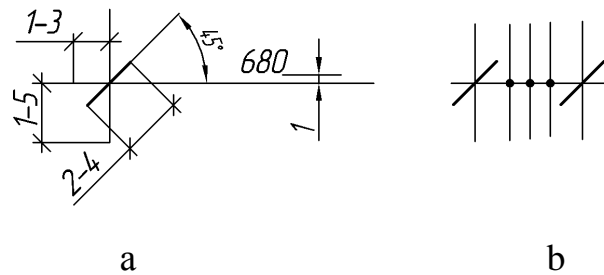


Fig. 3.1. Ticked lines dimensions while dimensioning

The distance from contour drawings to the first dimension line is recommended to withstand at least 10 mm. However, in practice, this distance is taken equal to 14 - 21mm. The distance between the following parallel lines shall not be less than 7 mm, and from the dimension line to the circle of coordination axis - 4 mm (Fig. 3.2).

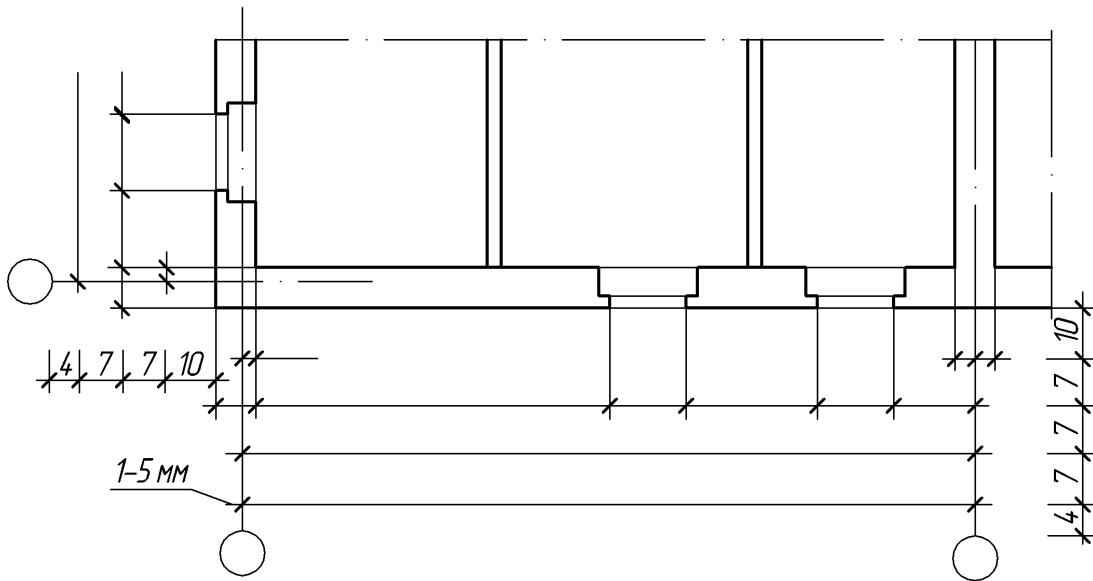


Fig. 3.2. The rules of lines dimensioning

If you have a picture with a number of identical elements placed at equal distances from each other (e.g. coordination axes of inner walls), dimensions between them are applied only at the beginning and at the end of the series (Fig. 3.3); and the total sizes between the extreme elements as the product of the number of elements are applied to the value of repetitive size.

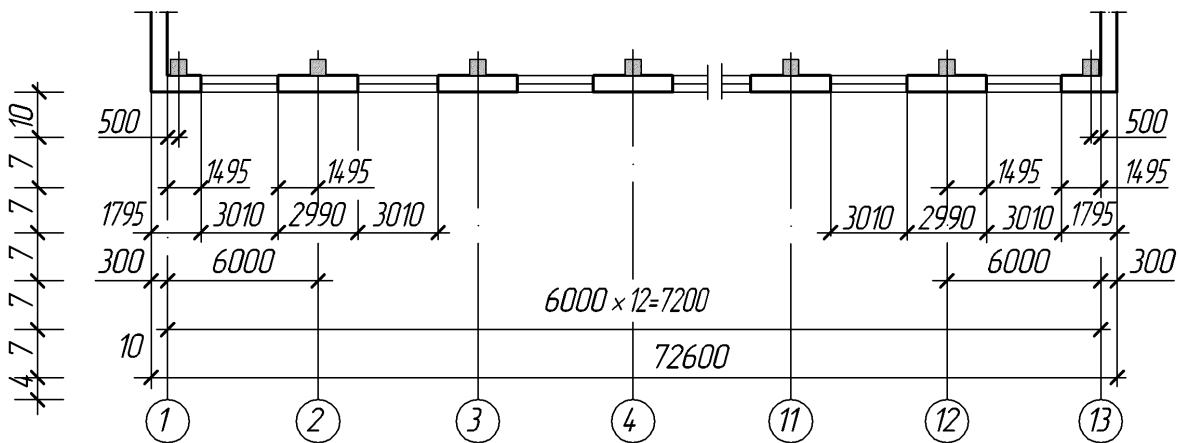


Fig. 3.3. Dimensioning if the elements repeat

Dimension line in construction drawings is limited by arrows according to All Union State Standard 2,307 - 68 in the case of necessity to specify the diameter, circle radius or angle, and while dimensioning are performed with the help of a common base, which places on a common dimension line (Fig. 3.4).



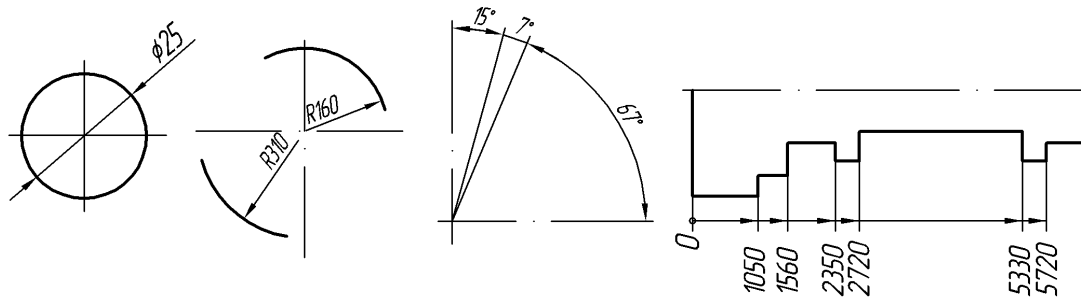
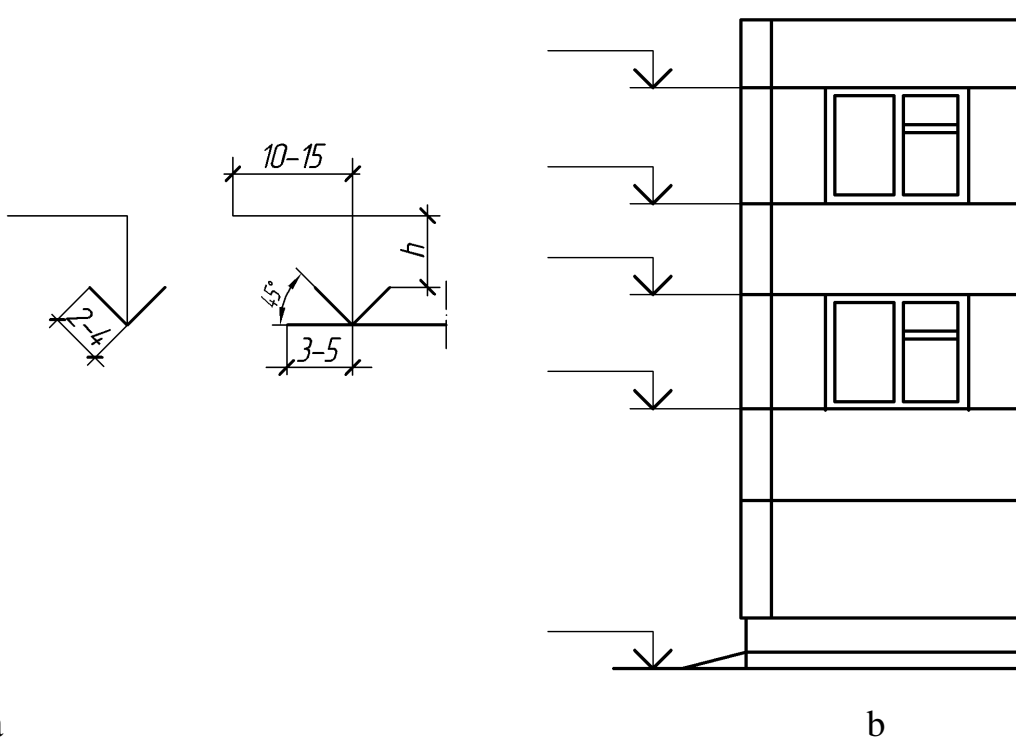


Fig. 3.4. Arrow usage

**3.2. The numerical markings.** Level marks (height, depth) on the plans, sections of facades show the distance in height from ground level adopted for conventional "zero". For zero, the platform level of the first (ground) floor is often taken. Level mark is shown by a conventional sign in the form of expanded arrow with a shelf (Fig. 3.5a). This arrow is performed by the baseline, which length is 2 - 4 mm; the arrow is carried out at an angle  $45^\circ$  to the extension line or contour line. Extension line is performed by solid thin line. Size  $h$  is recommended to take 2 to 6 mm, depending on the size of drawing. Length of the shelf is in the range of 10 to 15mm. In case that several level marks arrange one above the other around single image, vertical marks lines are recommended to place on the same vertical line, and the length of the horizontal shelves - to perform the same (Fig. 3.5b).



a

b

Fig. 3.5. Level marks imaging

Zero mark is applied unsigned. Marks above zero are applied with the sign "+", below zero – with the sign "-". Conditional zero marks are indicated as follows: 0,000. In construction drawing, level marks are indicated in meters with three decimal digits separated by a comma from the integer.

In plans, dimension mark value is applied in a rectangle, the outline of which is drawn by thin solid line, or on the line-outs shelf (Fig. 3.6). Before dimensional number, plus or minus is indicated.

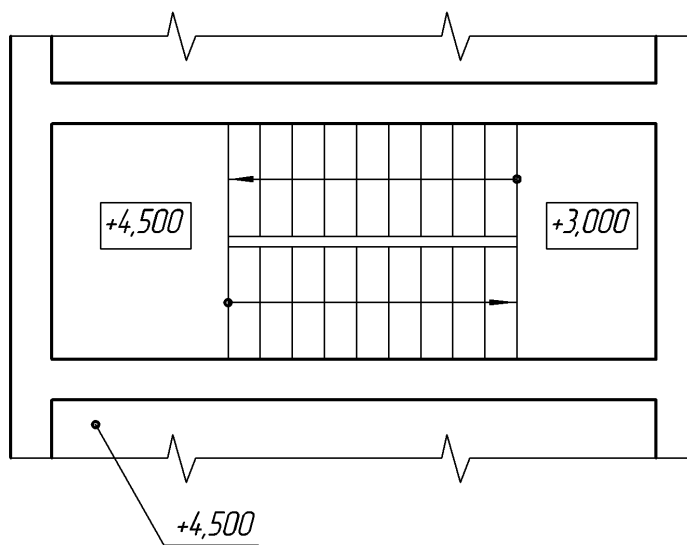


Fig. 3.6. Imaging the digital marks in plans

**3.3. Main inscription.** The main inscription to execute the project and working documentation for constructing buildings and structures of various purposes is performed accordingly to the standard Б А.2.4-4-99 (Fig. 3.7).

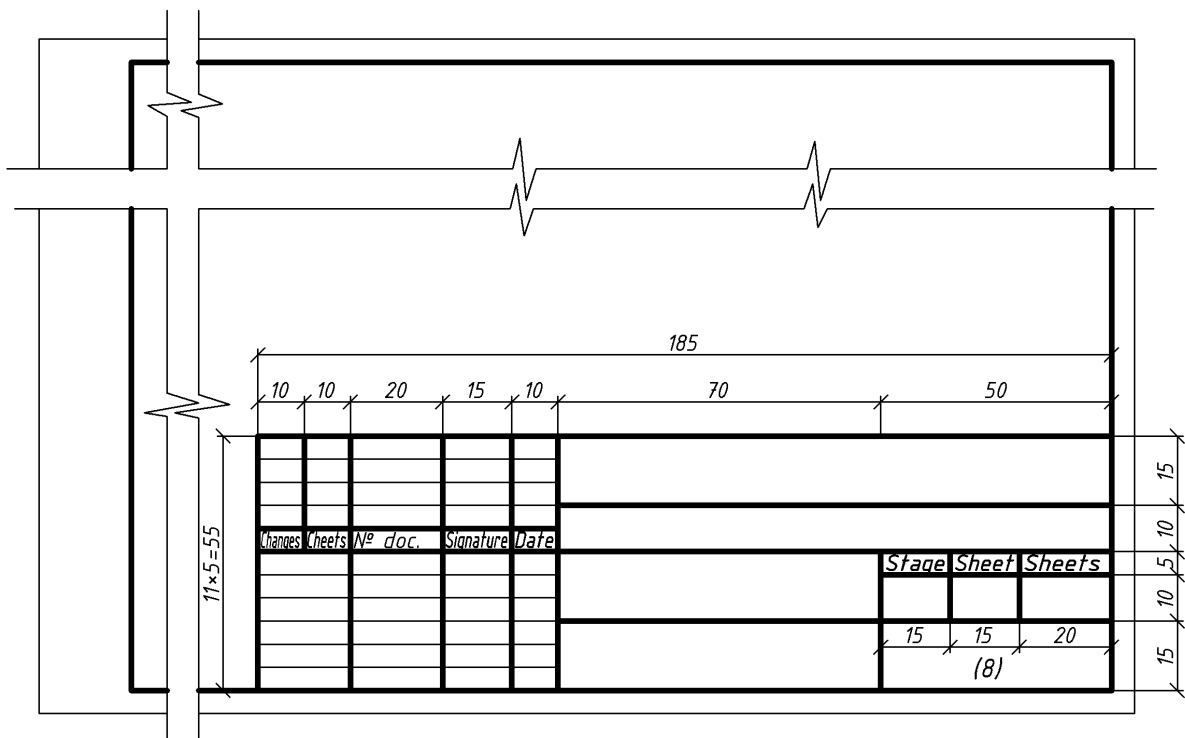


Fig. 3.7. Main inscription

**3.4. Inscription.** Fonts for inscriptions in construction drawings are used in accordance with All Union State Standard 2.304-81. The following font sizes in construction drawings are recommended:

in the main inscription: the name of the university, writing, object, etc. - 5 or 7 mm, other inscriptions 3.5 or 5 mm;

in the names of basic drawings and tables - 5 or 7 mm, minor drawings, text instructions, etc. - 3.5 or 5 mm, the digital data to fill tables - 3.5 or 2.5 mm;

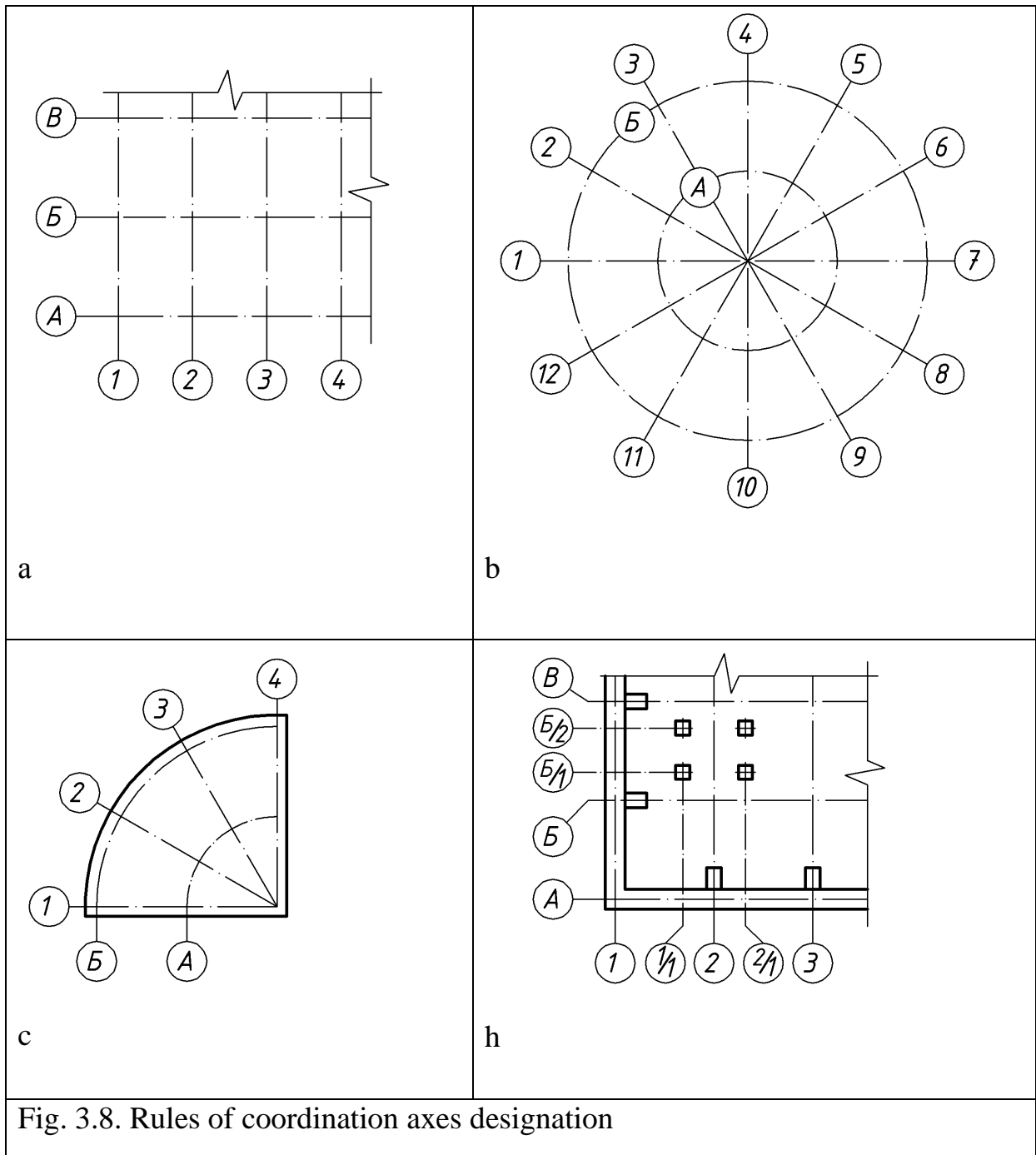
in the notation of coordination axes, numbering the nodes marking, position numbers in circles diameter 6 - 9mm, the font size is 3.5 or 5 mm, with a diameter of 10 to 12mm and more - 5 or 7 mm;

the height of dimensional value in the drawings made at the scale 1: 100 or higher, 3.5mm is recommended; and at the scale 1: 200 and smaller - 2.5 mm.

Font sizes for other inscriptions are taken depending on the size and saturation of drawings. Inscriptions are placed over the image and are not stressed.

**3.5. Coordination axes.** As noted above, the arrangement of individual structural elements of buildings and structures is defined dimensionally by means of linking to coordination axes of building. Coordination axes are the axes that define the placement of main walls or pillars. They are provided with an independent system of notation. The distance between coordination axes along the building is called a step, and crosswise of building – a bearer. According to Ukrainian national standardization system Б А.2.4.-4-99, coordination axes are applied to the building or structure image by means of thin dash-dotted lines with long dash marks, and are denoted by Arabic numerals and capital letters of Ukrainian alphabet (except letters: Є, З, І, І̇, Ї, О, Х, Ч, Ц, Ш, Ь), in circles with a diameter of 6-12 mm. The numbers indicate coordination axes along the side of the building and structures with a large number of axes from left to right. The letters indicate coordination axes upward. If there is a shortage of alphabet letters to indicate coordination axes, the next two letters indicate the axes, for example, AA, ББ, ВВ. Axes are usually applied on the left and bottom sides of the building plan (Fig. 3.8a), or, as shown in Figures 3.8b, c. When coordination axes of opposite sides of a plan do not coincide, designation of specified axes at the diverge points is applied additionally to the top and / or right sides. To designate coordination axes, it is necessary to use the font size once or twice larger than the size of the font size of dimensional numbers.

For certain elements located between coordination axes of the main load-bearing structures, additional axes are applied and designated as a fraction: above the line, designation of prior coordination axis is indicated, below the line - an additional serial number within the areas of coordination between adjacent axes (Fig. 3.8h).



#### 4. IMPLEMENTATION OF BUILDINGS PLANS

A plan is an image of building section performed by means of imaginary horizontal plane at a certain level (Fig. 4.1).

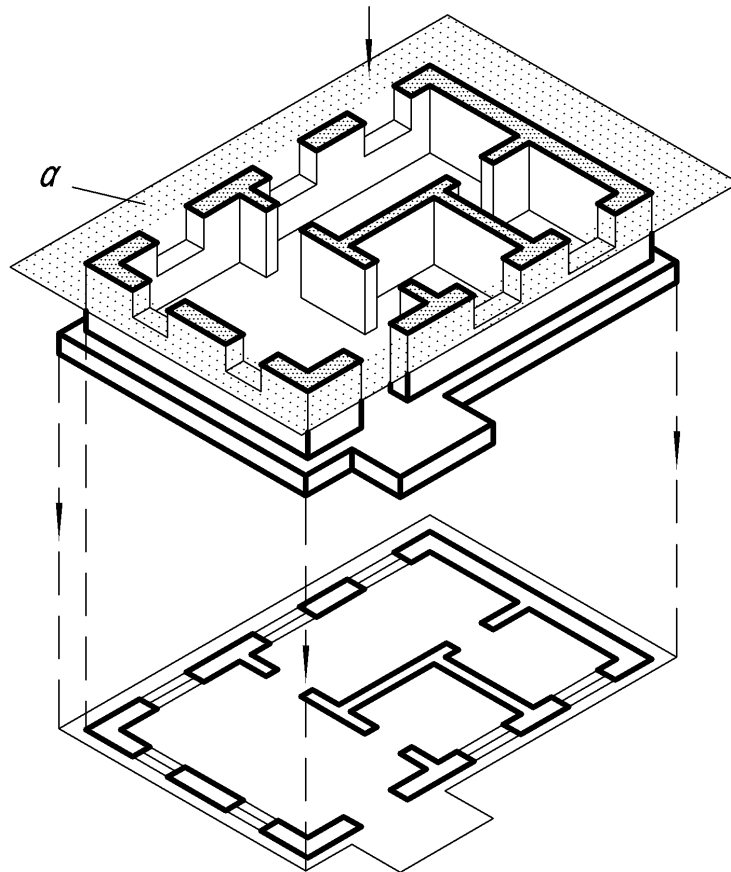


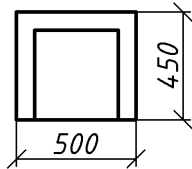
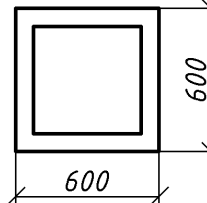
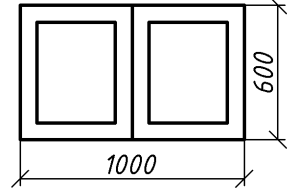
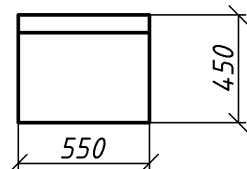
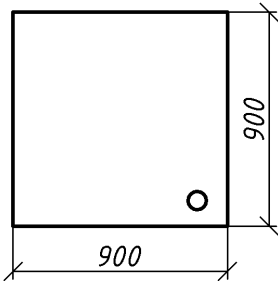
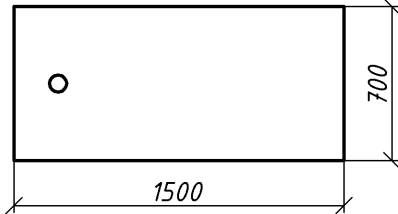
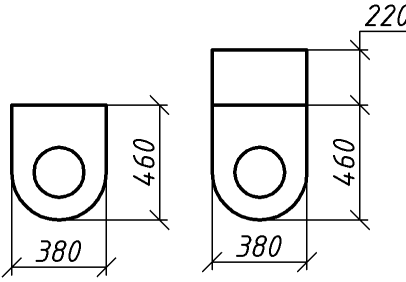
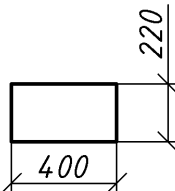
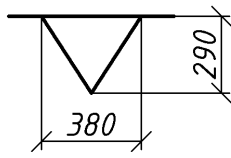
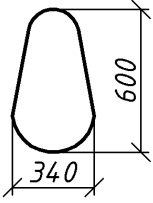
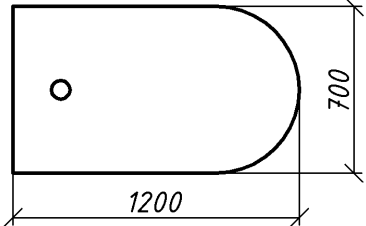
Fig. 4.1. Building plan development

Depending on the content of drawing and its purpose as well as on placing the cutting plane, the following plans are distinguished: the plan of floors; of foundations; of beam and slab structures; of platforms, of roofs (roof) and others. For residential and public buildings the intersecting planes are placed within the window and door openings of each floor.

The plan of the building gives an idea of its size and configuration, shows the shape and placement of individual buildings, window and door frames, main walls, stairs, leaves/partitions. The building elements outlines are put into the plan (walls, leaves/partitions, columns, etc.) and got in section and located below the cutting plane. The plans of buildings tend to show sanitation equipment (baths, toilets, sinks, etc.). If the stove heating is used in the building, then the stove placement is shown in the plan as well as the chimney flue and air flue. These flues are shown in the plans of buildings with central heating.

Sanitary installations are drawn in the plan in the same scale as the building plan. Dimensions of the most common sanitary equipment are presented in Table.1.

Table № 1. Dimensions of sanitary equipment

Sink	One-compartment sink	Two-compartment sink
		
Wash stand	Shower bath tray	Standard bath
		
Lavatory pan	Service box	Urinal unit wall-mounted
		
Bidet	Sitting bath	
		

The plan being drawn accurately, the image of building plan should be placed along the long side of the sheet. The part of a plan, which covers the main facade of the building, is recommended to fold to the bottom of the sheet. Determining the composition of various elements of the building, it is necessary to consider the place for dimensioning and marking coordination axes. Therefore, plan drawings must be located at the distance of 75-80mm from the sheet frame.

The plan is recommended to be performed in the following sequence.

1. Coordination axes are applied first longitudinal, then transverse (Fig. 4.1). They serve to anchor the building to the building grid coordination and to determine the position of supporting structures, as these axes are carried on the main walls or columns. In some cases, they may not coincide with the axes of symmetry walls.

Coordination axes are drawn by dash-dotted lines with long dash-marks of 0.3 – 0.4 mm thickness. They are expended out the wall contour and marked as described above.

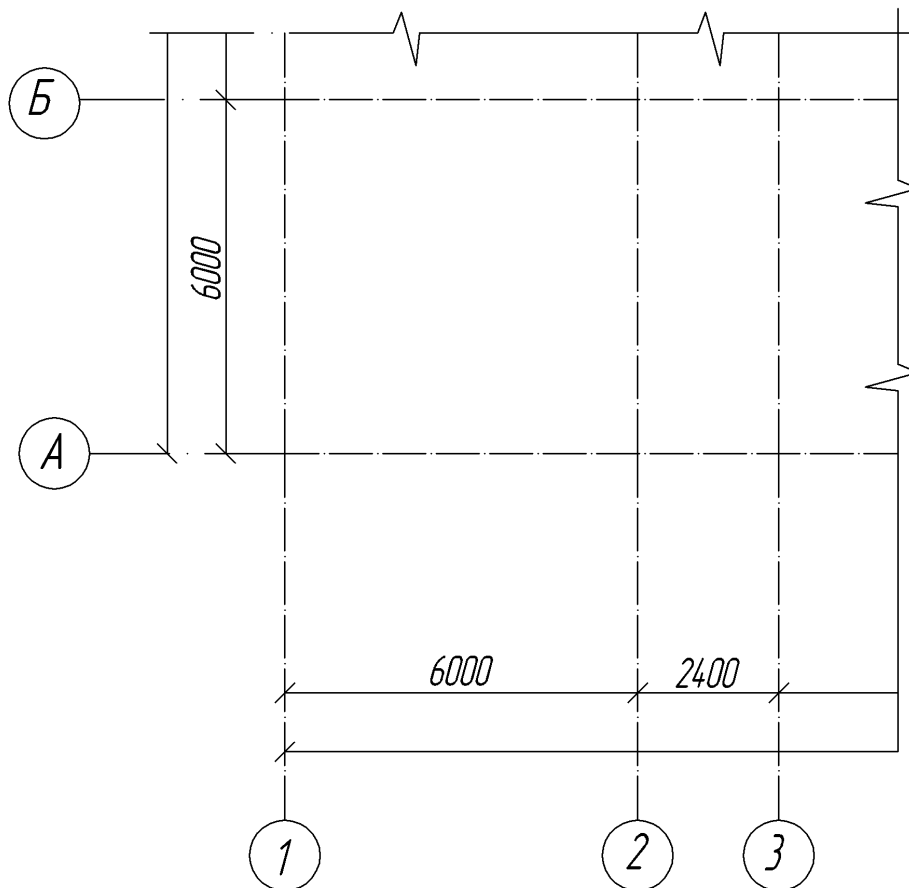


Fig. 4.1. First stage of plan performance

2. Using the thin lines (thickness 0.3 – 0.4mm) we draw the outlines of longitudinal and transverse outer and inner main walls and columns (Fig. 4.2). Main outer and inner walls, columns and other structural elements are linked to



coordination axes, i.e. the distance from the outer or inner wall to coordination plane axes of building are set.

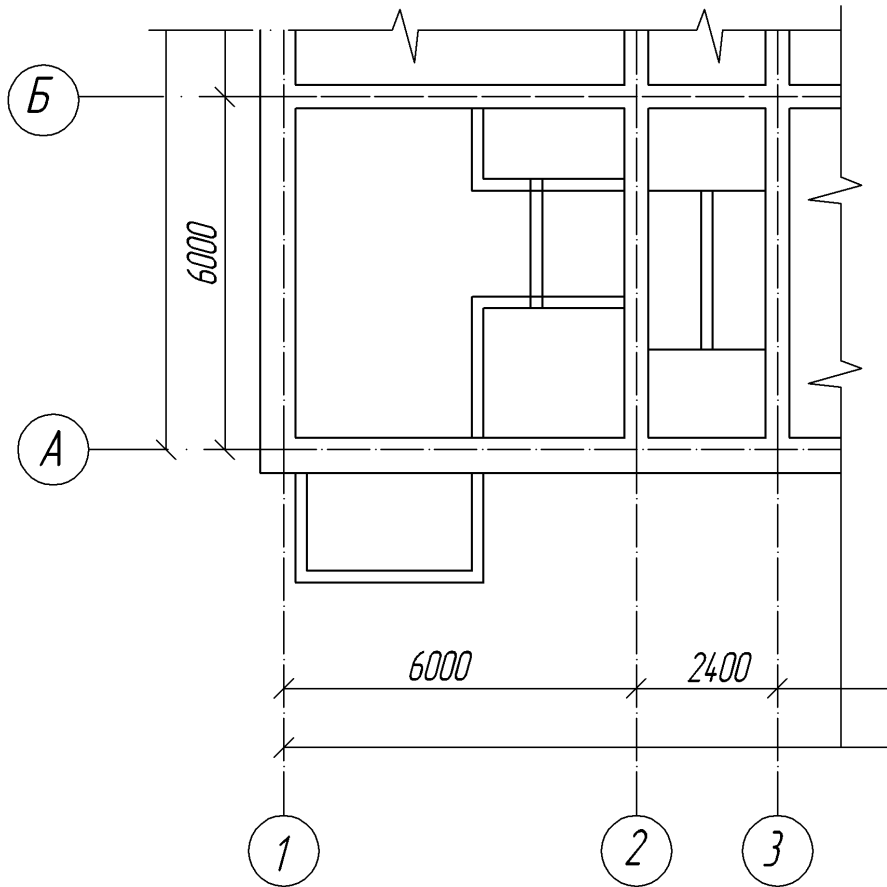


Fig. 4.2. Second stage of plan performance

The partitions outlines are drawn by thin lines. Special attention should be paid to joining the outer capital walls (Fig. 4.3a), inner and outer capital walls (Fig. 4.3b) and capital walls and partitions (Fig.4.3c).

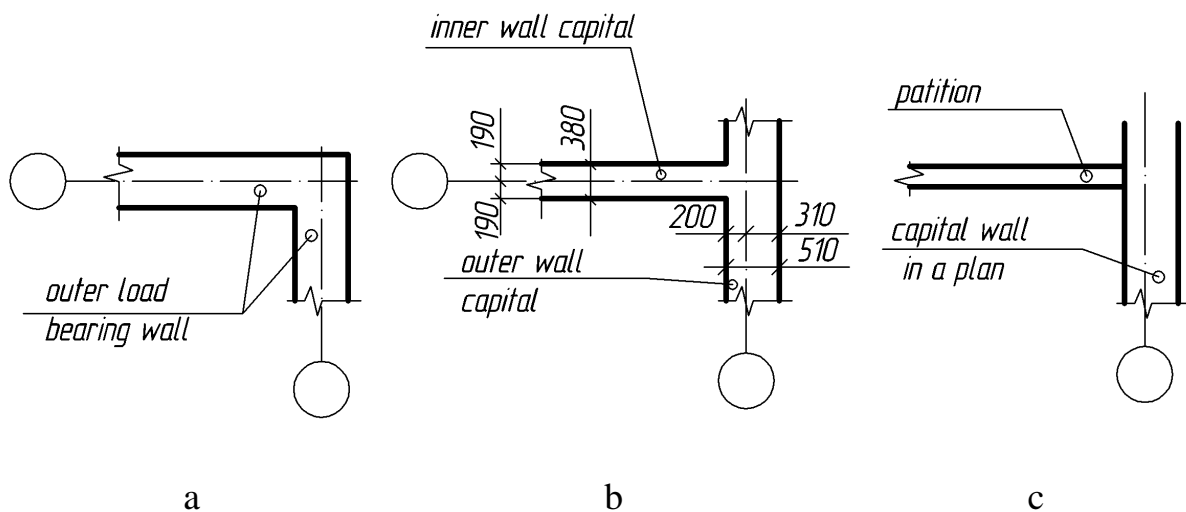
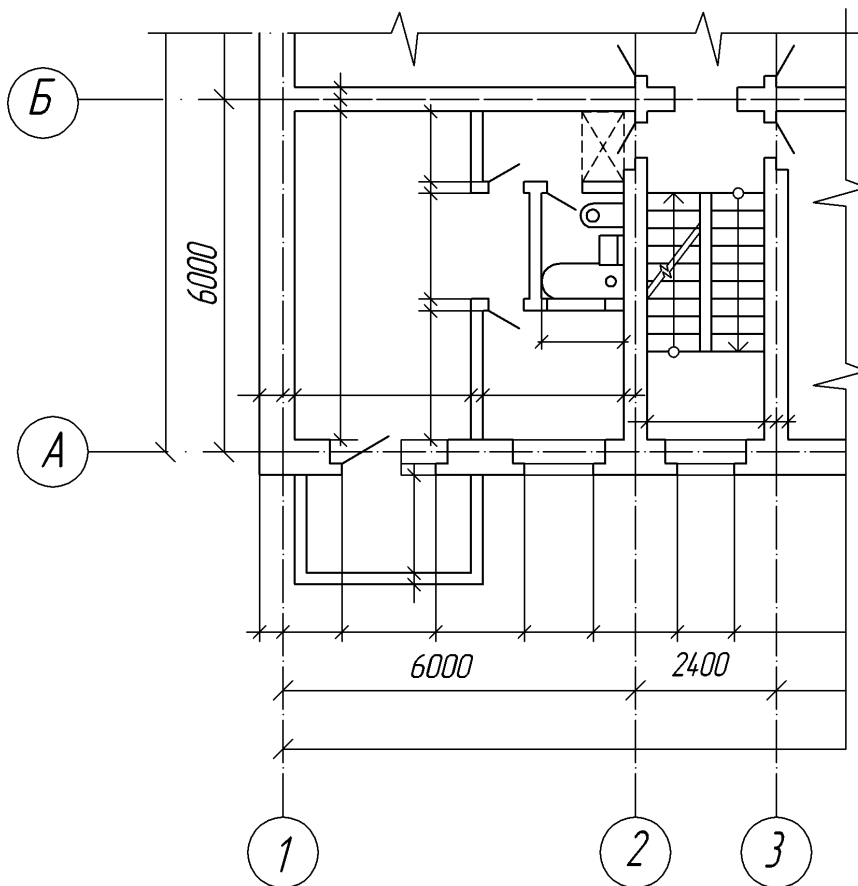


Fig. 4.3. Means of joining the walls and partitions.

3. On the third stage, the partitioning of window and door openings are performed and circled by the lines of appropriate thickness (Fig.4.4) Graphical symbols of window and door openings are performed accordingly to the Ukrainian national standardization system Б А.2.4-7-95.



Fig, 4.4. Third stage of plan execution

When drawing the plan in scale 1:50 or 1:100 with the presence of quarters in openings, their conventional images are given. Quarter is a performance at the upper and lateral parts of brick walls openings, which reduces the draft (blowing) and facilitates the attachment of window boxes (Fig. 4.5).

When you choose the line thickness while drawing, it is necessary to take into account that the dividing walls outlines are performed by the lines of less thickness as compared with the supporting capital structures.

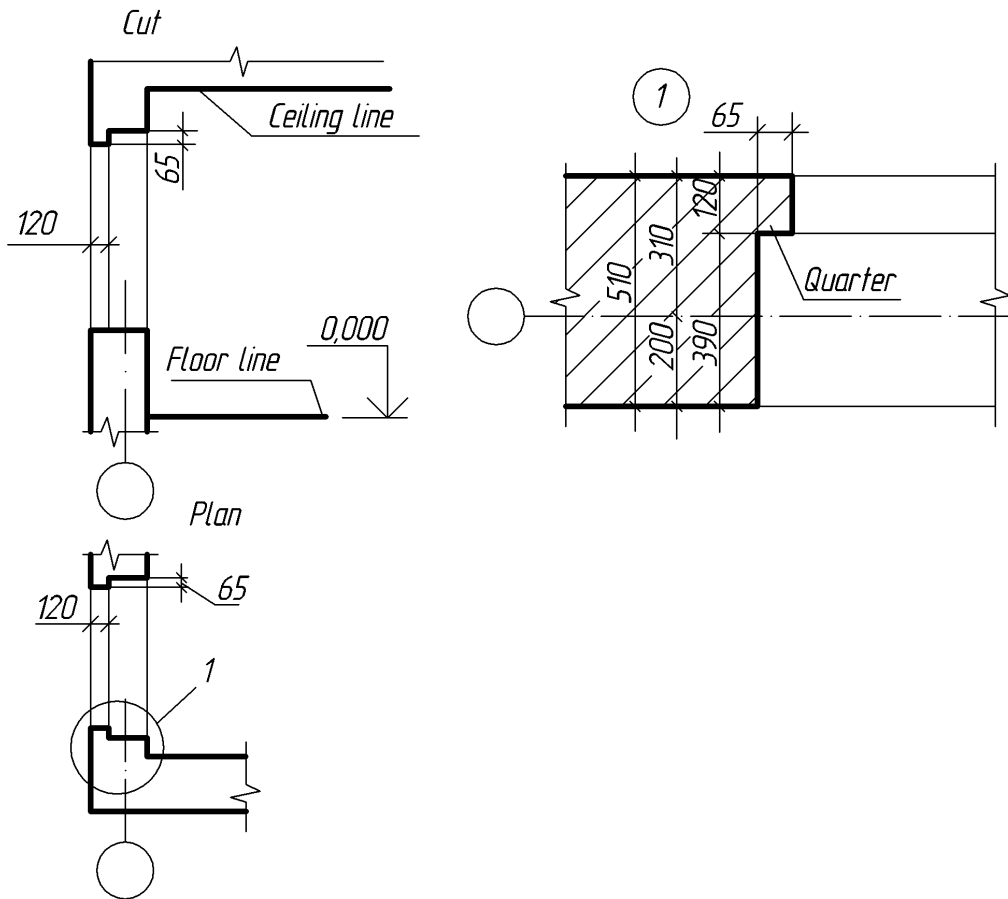


Fig. 4.5. Window openings with quarters.

Further, the conventional images of steps and sanitary and other equipment are drawn; the direction of opening the door is indicated as well. When performing the building plan drawings, graphical denotation of furnaces and sanitary equipment should be made in a scale approved to this plan.

Extensional lines, dimension lines and circles marking are applied.

5. At the final stage, the required size, axes marks and other elements are put down (Fig. 4.6). In the plan dimensions, the size of the structure, the thickness of walls and partitions, the binding of interior walls to coordination axes and barriers - to inner and outer walls or to the coordination axes are indicated. The sizes of openings in interior walls and brick partitions are applied, as well as their binding to the walls outlines or to the coordination axes. Dimensions of doorways in partitions are not shown in the plan.

According to the plan dimensions, usually in the first chain, starting from the contour plan, the sizes of the width of window and door openings, piers and buildings protrusions with reference to their axes are put down. In the second chain, the sizes between the axes of the main walls and columns are applied. In the third chain, the sizes between the extreme coordination axes of extreme outer walls are applied.

Further, the necessary inscriptions are fulfilled. In the inscriptions of civilian buildings the number on the floor as "The 2nd floor plan" can be written and the section planes of cuts are put down. Drawing of the floor plans is accompanied by specifications of structural elements, cloakroom equipment specifications, explication of the premises, furnishings data (decoration) of premises and so on.

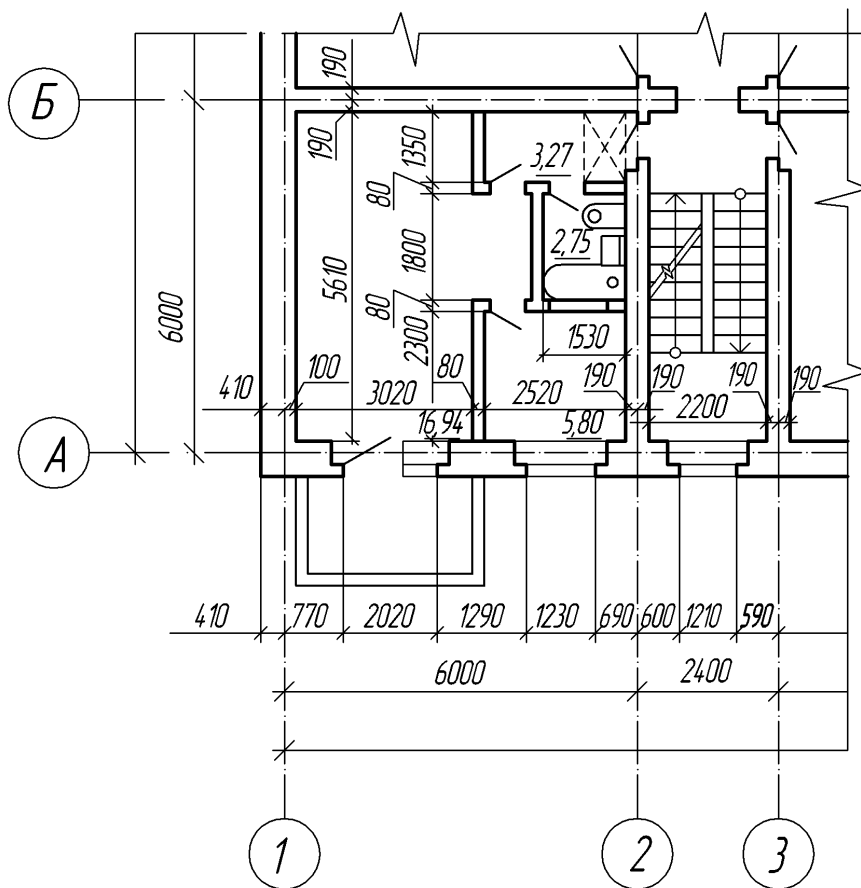


Fig. 4.6. Final stage of plan execution

## 5. STAIRS DRAWING

Stairs are important part of building. Or the purpose intended, they are divided into the main or arterial, and service, or supporting ones. Service stairs are used to interface with basements, attics and as spare at evacuation in case of fire. Fire-escape stairs are designed for external access to the floors, attics and roofs.

Taking into account the material the stairs are made of, they are divided into reinforced concrete, wood and metal. Taking into account the manufacturing method, they are divided into prefabricated and monolithic reinforced-concrete.

Stairs consist of fliers and landings (Fig. 5.1) Flier is a structure consisting of a certain number of steps. Steps are based on joists-strings arranged under the steps. Flier consists of pedestrian guardrails – banisters. The height of pedestrian guardrails is 90-95 cm. The ends of flier bearing elements are based on the landing bearing elements - landing beams.

In modern buildings the stairs are mounted using mainly the large solid stepped fliers and landings. These items are made of reinforced concrete.

Two-flier stairs with large sizes elements

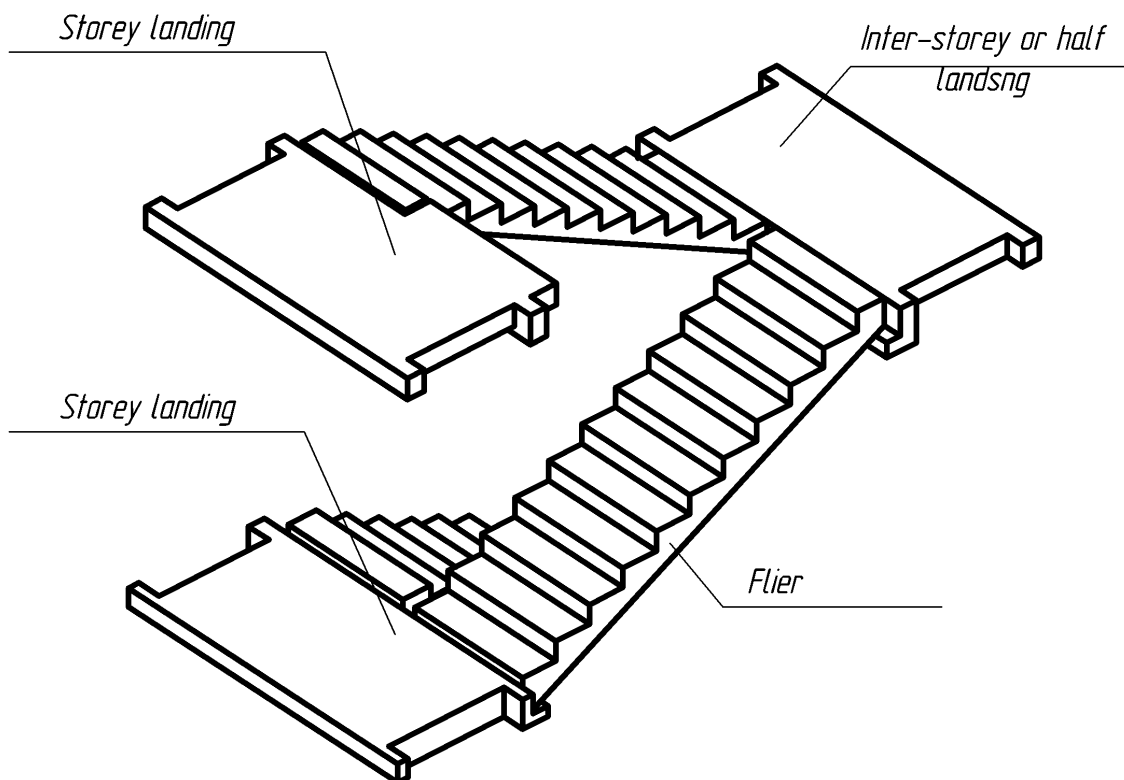


Fig. 5.1. Flier.

The step height of the one-flier stairs equals the floor height. In two-flier stairs the step height of one flier is assumed to be equal to a half-height of a floor. The width of fliers is usually taken within 90 - 240sm, for service stairs - not less than

90cm, for the main - at least 105cm. The fliers are usually mounted with slopes of 1: 2, 1: 1.75; 1: 1.5. At least 3 and no more than 18 steps can be used in each flier. Each flier for one of the platforms will be stepped upward and downward for the second. The upward flier starts from lower framed step that is the transition to the platform, and downward flier - upper framed step (Fig. 5.2). Lower and upper framed steps coinciding with the platform deck possess the special outlines. All the other flier steps are the same. Stair steps are characterized by the height  $h$  and the width  $b$ . For the convenient use of stairs, it is necessary that the doubled height and width in the sum equal to the average human step, taken from 570 to 640 mm. This value is usually taken 600 mm. Thus,  $b+2h=600$ .

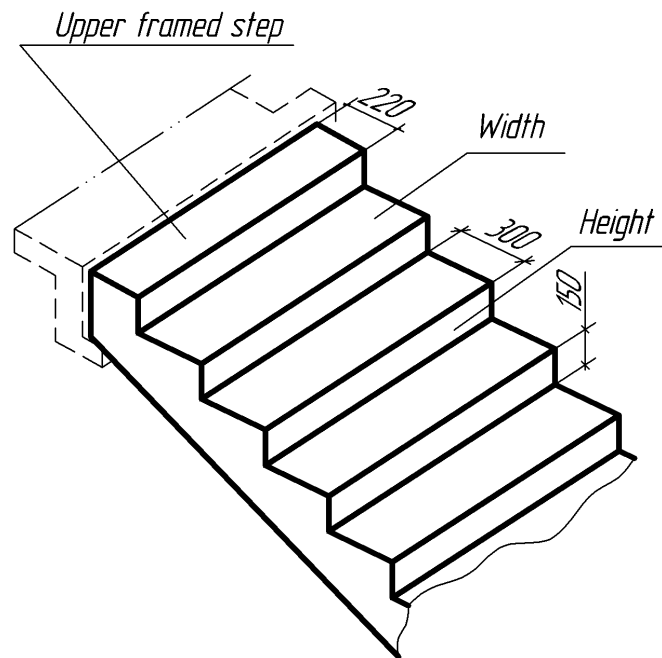


Fig. 5.2. Flier elements

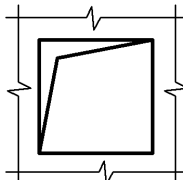

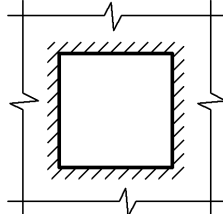

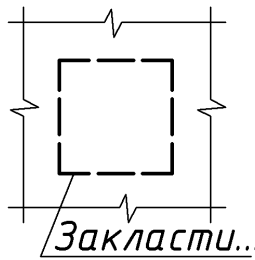

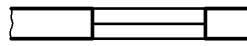
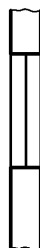
The step height is within 135 - 180 mm (usually 150mm). The width - 250-300 mm. As to the main stairs for linking with the Unified modular system (UMS), the width is taken 300 mm, then  $300+2\times 150=600$ .

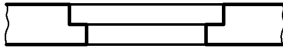

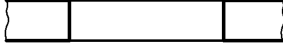
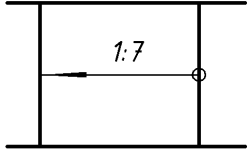
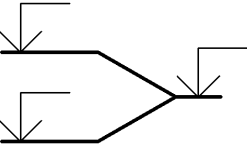
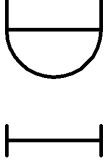
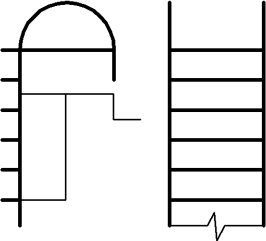
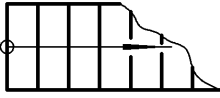
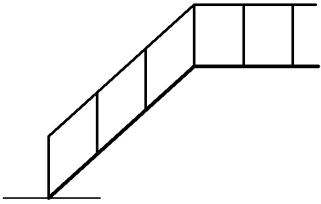
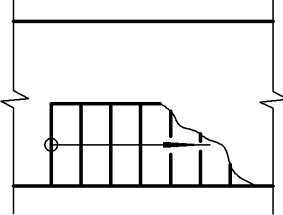
Stair platforms mounted at the level of each floor, are called the storey landing, stair platforms mounted between the floors - the half landings. The width of stair platform must be no less than the flier width and no less than 1200 mm, in buildings with elevators, landings should be a minimum width of 1600mm, and hospitals no less than 1900mm.

## 6. CONVENTIONAL GRAPHICAL IMAGES IN BUILDING STRUCTURES AND THEIR ELEMENTS

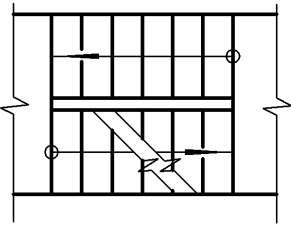
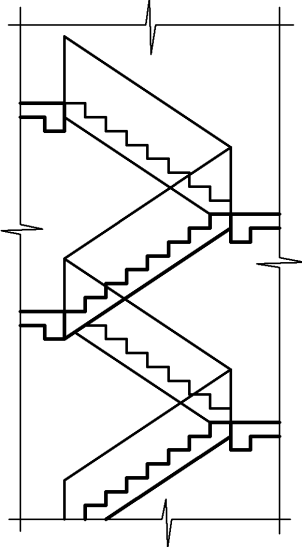
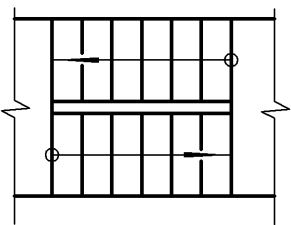
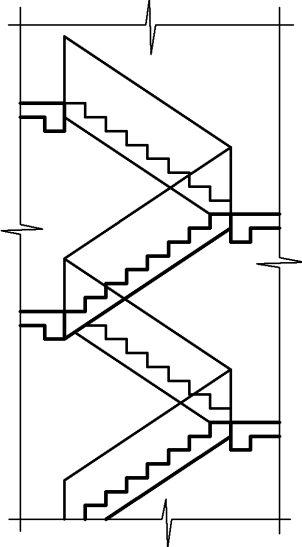
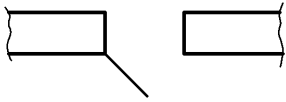
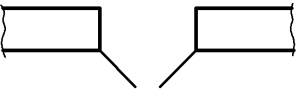
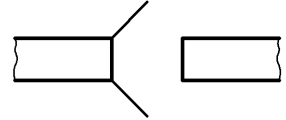
Conventional image of building elements are shown in the Ukrainian national standardization system Б А.2.4-7-95. In Table №4 the names and images of building structures are given.

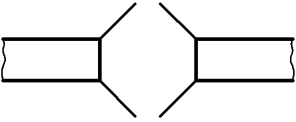

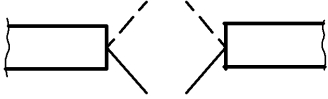




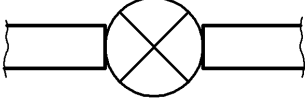
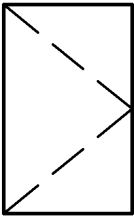
Table №2. Conventional graphical images of building structures and their elements.

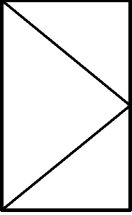
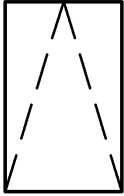
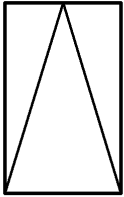
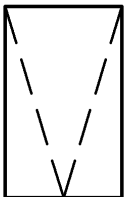
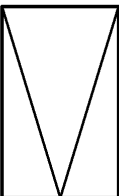
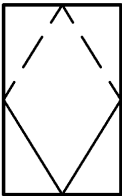
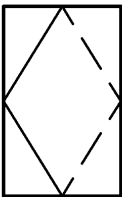
Denomination	Image	
	in a plan	in section
<b>1. Apertures 2.1.</b> Aperture (projected without filling)		
2.2. Aperture to be punched in the existing wall, partition, surface, floor slab panel		
2.3. Aperture to be made in the existing wall, partition, surface, floor slab panel Note. In a note the bookmark material is indicated instead of dots		
2.4. Apertures a) without quarters		

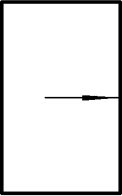
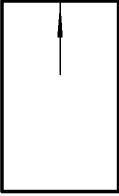
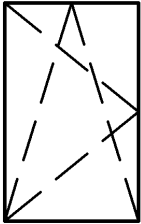
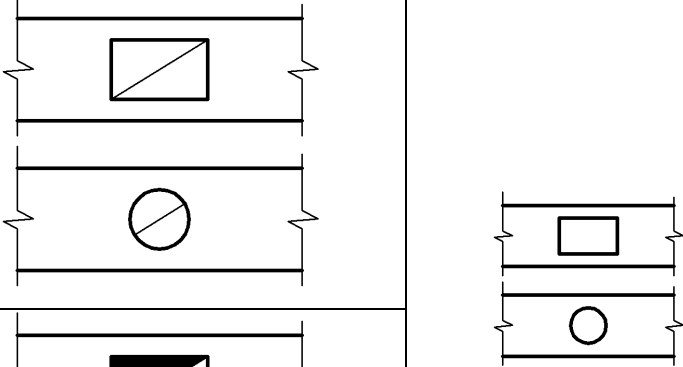
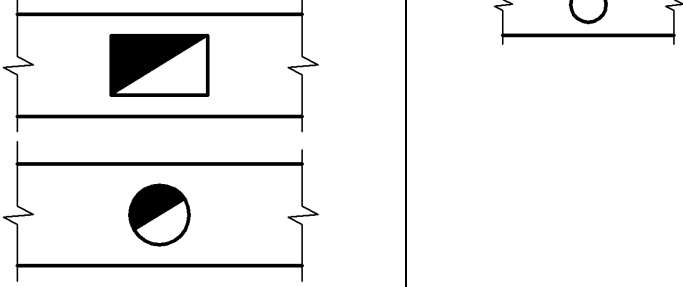
<p>b) with quarters</p>		
<p>c) in 1: 200 or less, and for drawings of prefabricated structural elements</p>		
<p><b>3. Entrance ramp</b>          Note. Entrance ramp slope is pointed in terms of a percentage (ie 10.5%) or as a ratio of height and length (eg, 1: 7). The arrow shows the direction in terms of descent</p>		
<p><b>4. Stairs</b>          4.1 Metal stairs:          a) vertical</p>		
<p>b) sloping</p>		
<p>4.2. <b>Stairs:</b>          a) lower flier</p>		<p>In the scale of 1:50 or more</p>

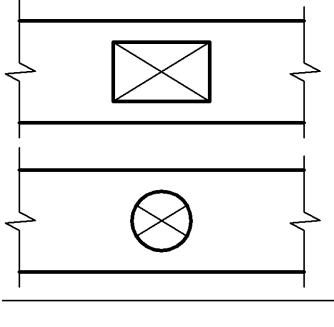
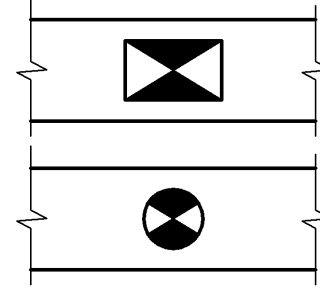


<p>b) half flier</p>		
<p>c) upper flier</p>		 <p>In the scale of 1: 100 or less and for the schemes of component arrangement of prefabricated structures</p>
<p>Note: The arrow shows the flier lifting direction.</p>		
<p><b>Denomination</b></p>	<p><b>Image</b></p>	
<p><b>5. Doors, gates</b> 5.1. Single-door</p>		
<p>5.2. Folding doors</p>		
<p>5.3. Double single doors</p>		

5.4. Double folding doors	
5.5. Single doors with shaky canvas (right or left)	
5.6. Folding doors with shaky canvas	
5.7. Horizontal sliding single doors (gates)	
5.8. Horizontal sliding folding doors (gates)	
5.9. Lifting door (gate)	
5.10. Articulated door	
5.11. Rotating door	
<b>6. Window frames</b> 6.1. Frame with side hanging that opens inside	

6.2. Frame with side hanging that opens outside	
6.3. Frame with lower hanging that opens inside	
6.4. Frame with lower hanging that opens outside	
6.5. Frame with upper hanging that opens inside	
6.6. Frame with upper hanging that opens outside	
6.7. Frame with middle hanging horizontal	
6.8. Frame with middle hanging vertical	

<p>6.9. Horizontal sliding frame</p>		
<p>6.10. Lifting frame</p>		
<p>6.12. Frame with side or lower hanging that opens inside          Note.          The top icon (shown by dash marks) should be sent to the binding, on which the frame is not mounted</p>		
<p><b>Denomination</b></p>	<p><b>Image in the scale</b></p>	
	<p><b>1:50 i 1:100</b></p>	<p><b>1:200</b></p>
<p>7 Chimney and air flues          7.1. Air pits and flues</p>		
<p>7.2. Chimney pipes (solid fuel)</p>		

7.3. Chimney pipes (liquid fuel)		
7.4. Gas outlet pipe		

## 7. CONTENT OF TASKS

Graphics in section "Construction drawings" students perform on variants (Table. №3). Each student receives a scheme of building floor arrangement (schematic views are presented in Appendix A). Schematic view reflects all the inner and outer walls applied by the contour lines. At the outer walls' break the inscriptions –W-1, W-2, W-3, W-4 are written down. These inscriptions indicate the window apertures of different sizes in the wall. At the inner walls' break in a circle the numbers 1,2,3,4 are written down. They indicate the door apertures of different sizes in the wall. In the middle of the room in a circle the numbers 1,2,3,4 are written down, which mean that facilities are of different purposes:

1. Living accommodation
2. Kitchen
3. Bathroom
4. Toilet room

Schematic view presents the dimensions of each room and outside measurements of building. Through the outer and some inner walls the coordination axes are made, which end in the form of large circles outside the plan. The walls, through which the coordination axes do not pass, are considered to be partitions.

When doing this graphic work, student draws the floor plan on the scheme; and in this plan instead of inner and outer contour lines, through which the coordination axes are made, he/she performs reflection of outer and inner main walls of a certain thickness. Instead of W 1,2,3,4, and circles with numbers, it is necessary to reflect window openings and doorways of adequate sizes. Instead of contour lines, through which the coordination axes do not pass, it is necessary to reflect the walls partitions. The plan should be executed at A3 format and in scale 1:1000. In the plan the main inscriptions of construction drawing should be used. The longer side of a building is arranged along the format in the plan. The main facade is arranged from the part of the main inscription.

Table №3. Task variants

Variant	Scheme drawing
1,11,21	1
2,12,22	2
3,13,23	3
4,14,24	4
5,15,25	5
6,16,26	6
7,17,27	7
8,18,28	8
9,19,29	9
10,20,30	10

### 7.1 The execution of plan

1. To apply cross and longitudinal coordination axes by the dash-dotted lines. These axes should be arranged in such a way to have enough space to put down all the necessary sizes from all sides of the plan.

2. The contours of the longitudinal and cross external and inner capital walls are drawn by thin lines. The thickness of capital walls is taken 510 mm, the inner walls – 380 mm. The arrangement of capital walls relative to coordination axes and their connection should be executed as shown in Fig. 10.1a.

3. Partitions contours are drawn by thin lines. Partitions are drawn by 120 mm thickness; their connection with capital walls should be performed as shown in Fig, 10.16.

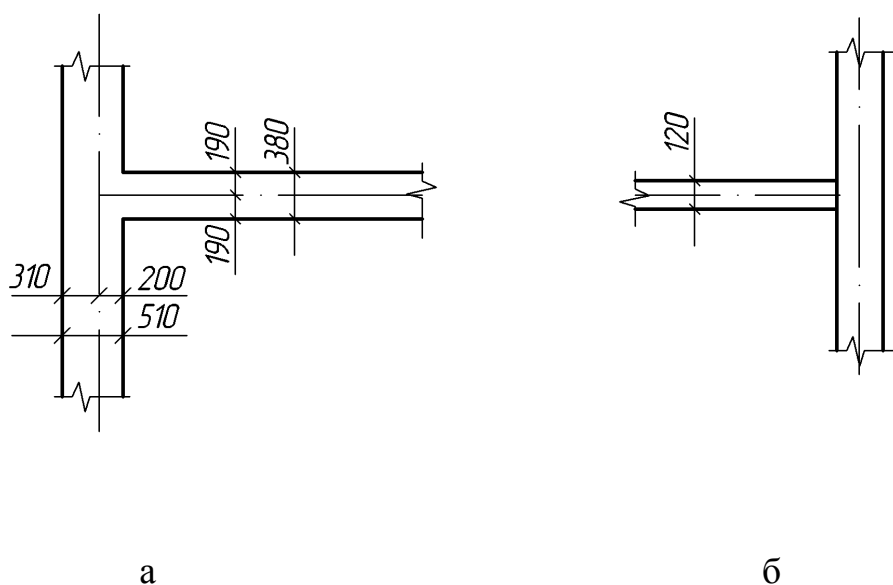


Fig. 10.1. Walls and partitions connection.

4. To execute the arrangement of window and door openings and to outline the contours of capital walls and partitions. The thickness of capital walls lines is 1 mm, the partitions – 0, 4 mm. to perform the window openings without quarter. Window and door opening are shown in Table №4.

Table №4

Window openings			Door openings		
Denotation	Width b, mm	Height h, mm	Denotation	Width b, mm	Height h, mm
W1	760	1810	1	710	2070
W2	1210	1810	2	910	2070
W3	1360	1810	3	1310	2370
W4	1510	1810			

5. The conventional denotation of stairs, sanitary equipment (in kitchen - gas stove, kitchen sink. In the toilet room – a toilet bowl, in the bathroom – a bath tub, a sink) is drawn.

6. The extensional and dimensional lines and marking circles of coordination axes are applied. Dimensional line should be applied in three dimensional chains

7. The required dimensional numbers, axes marks and other elements are applied. According to the plan, in the first chain, starting from the plan contour, the sizes of the width of window and door openings, partitions, building protrusions with reference to their coordination axes are indicated. In the second chain the sizes between the coordination axes are indicated. In the third chain the sizes between extreme coordination axes are applied. Sizes are put down from all plan sides. In the plan dimensions the sizes of the rooms, the thickness of walls, partitions, and the connection of interior walls to axes, partitions to inner and outer walls are indicated. The sizes of inner walls are put down.

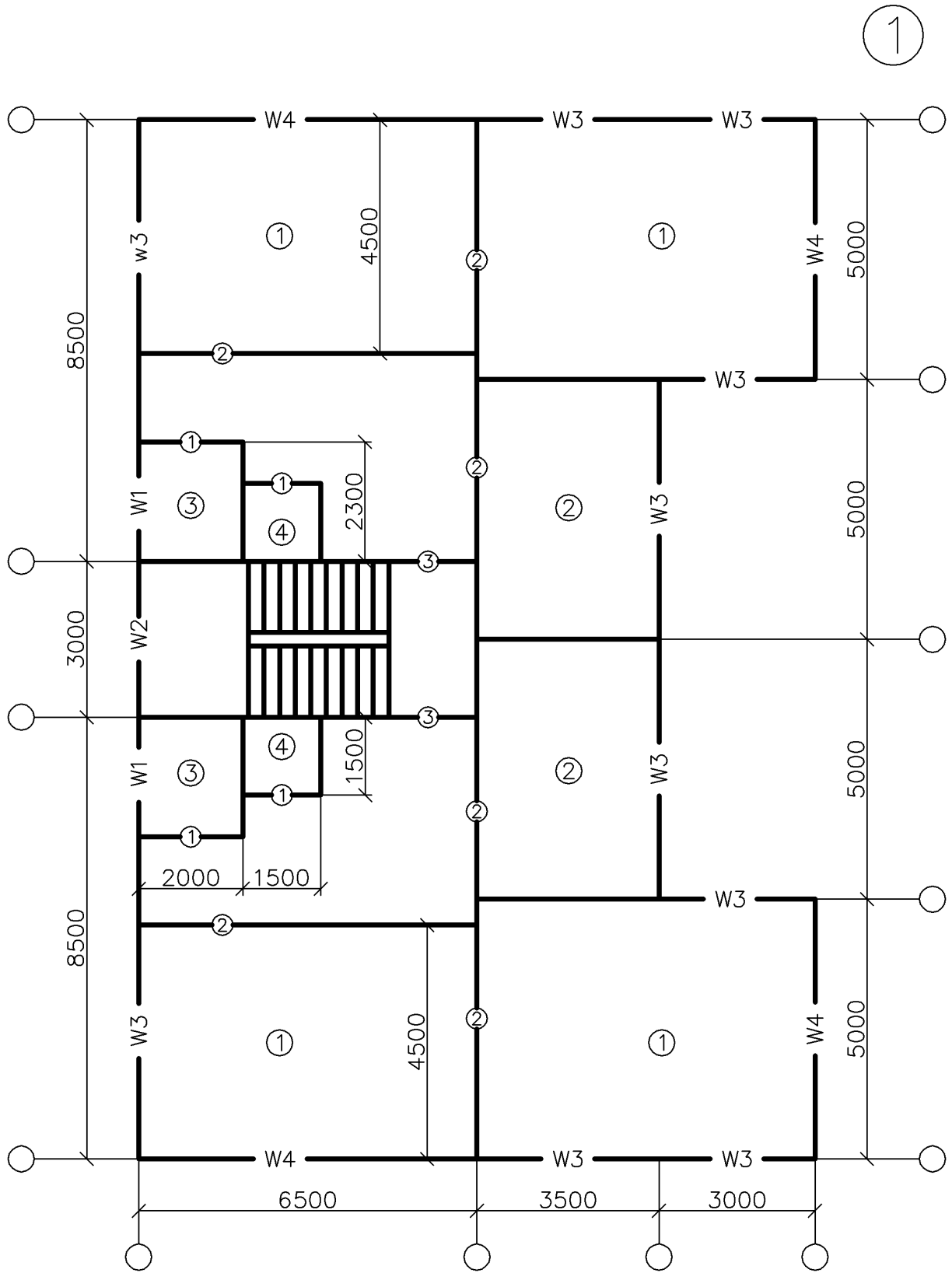
8. The required inscriptions are performed. In each accommodation the square of a room is indicated, the numbers are placed at the bottom right and underlined. The inscription “The 1<sup>st</sup> floor plan” is made above the plan.

9. The section planes are indicated.

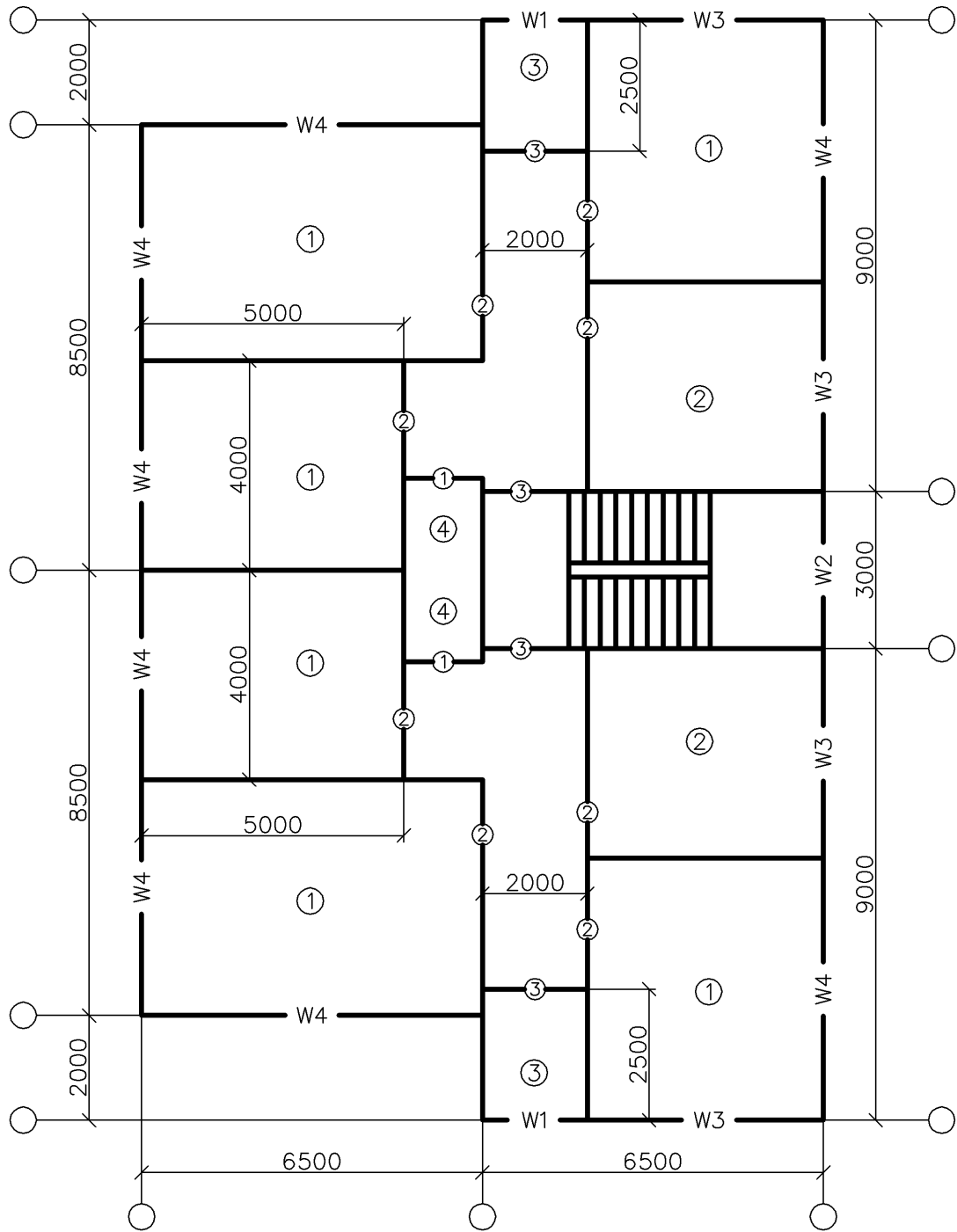
The sample of plan execution is given in Supplement B

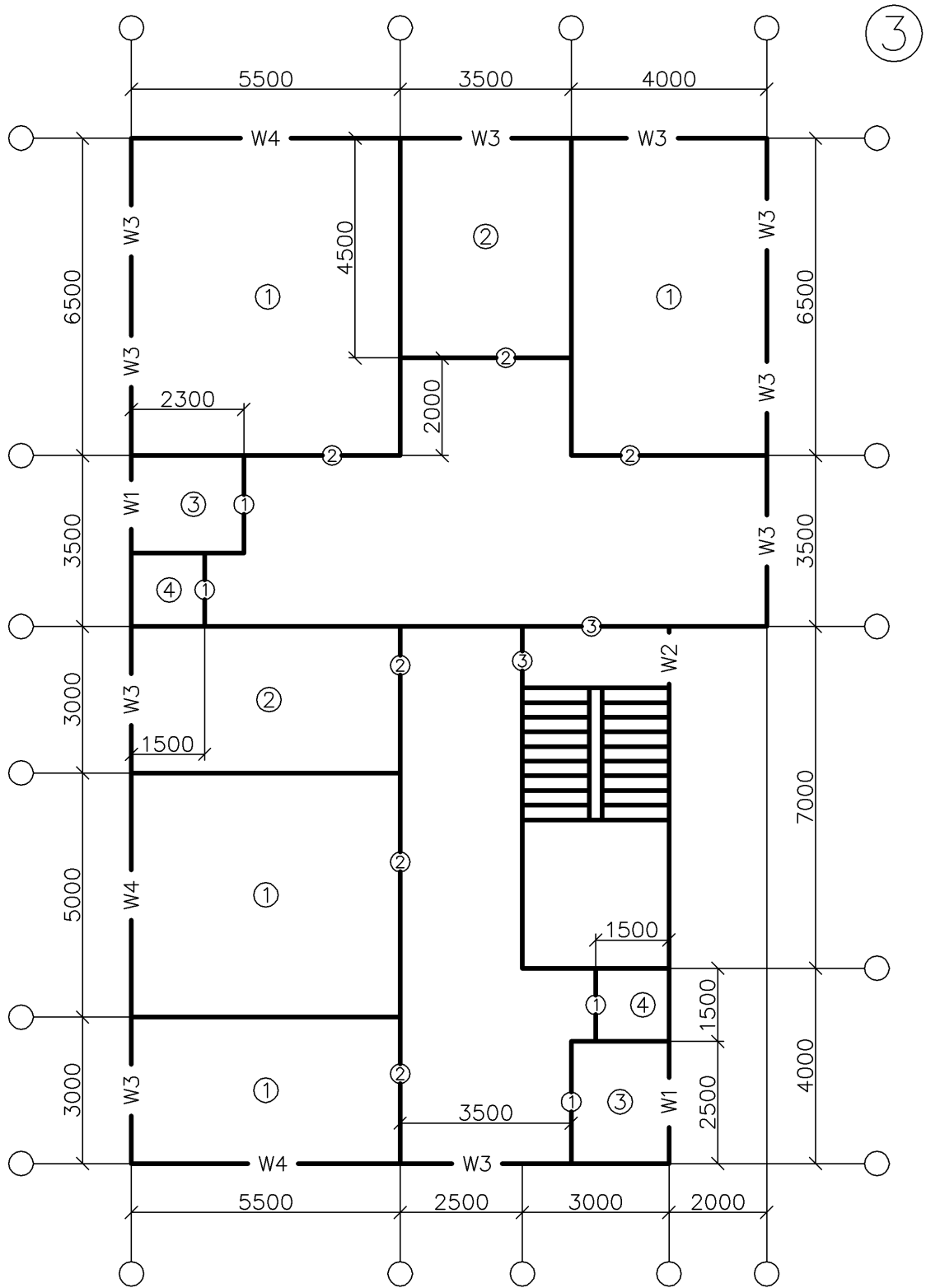


Supplement A

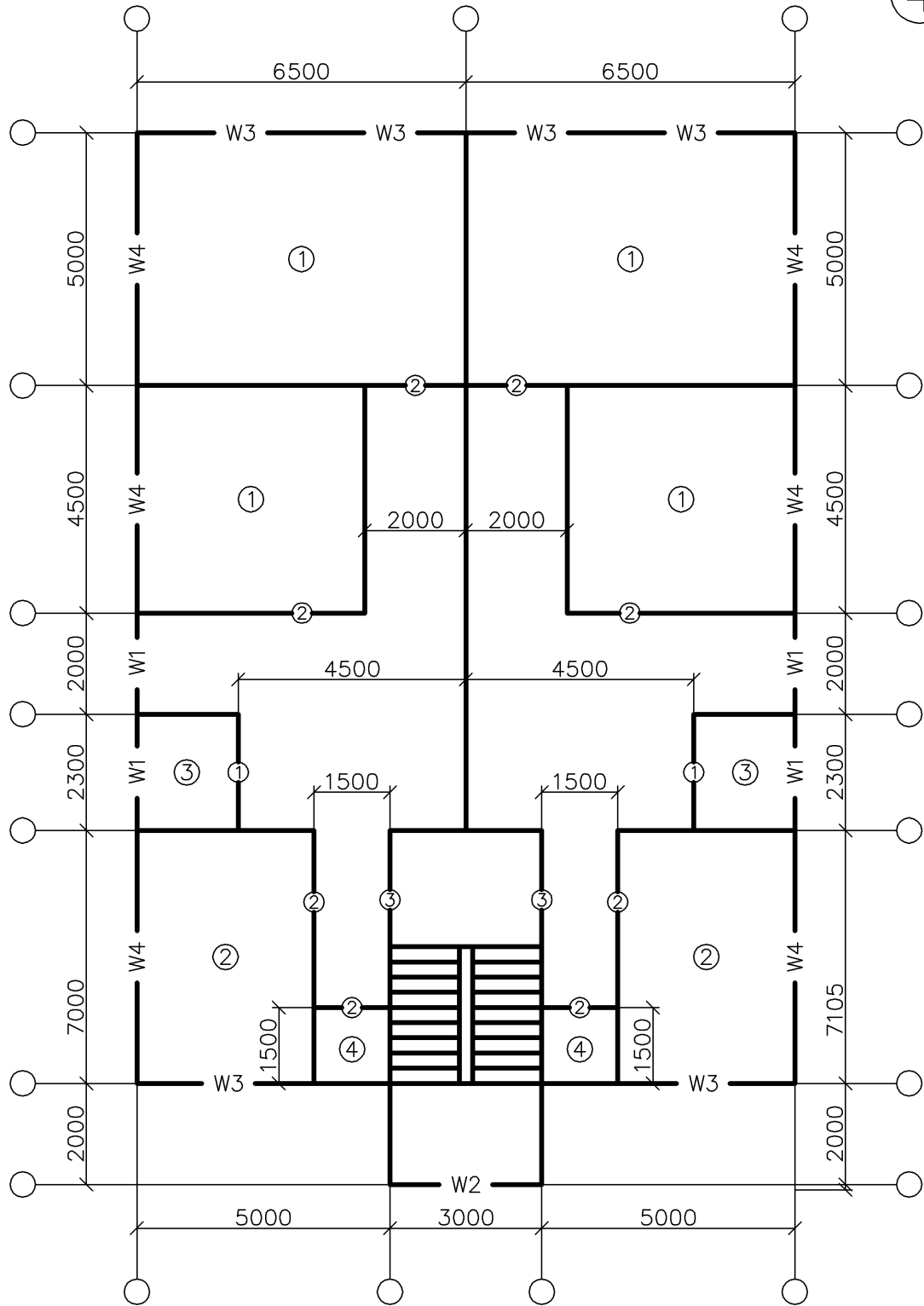


②

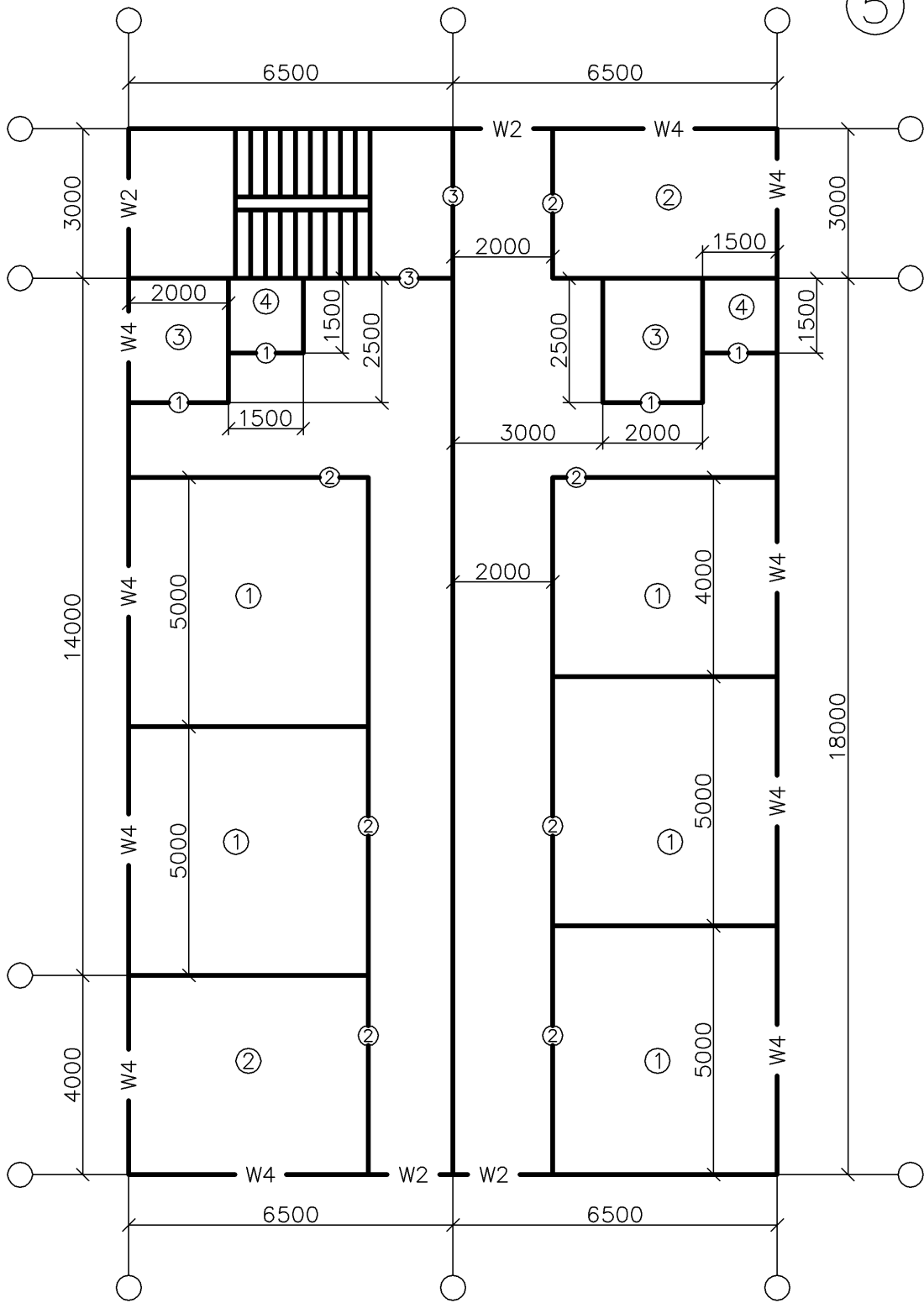




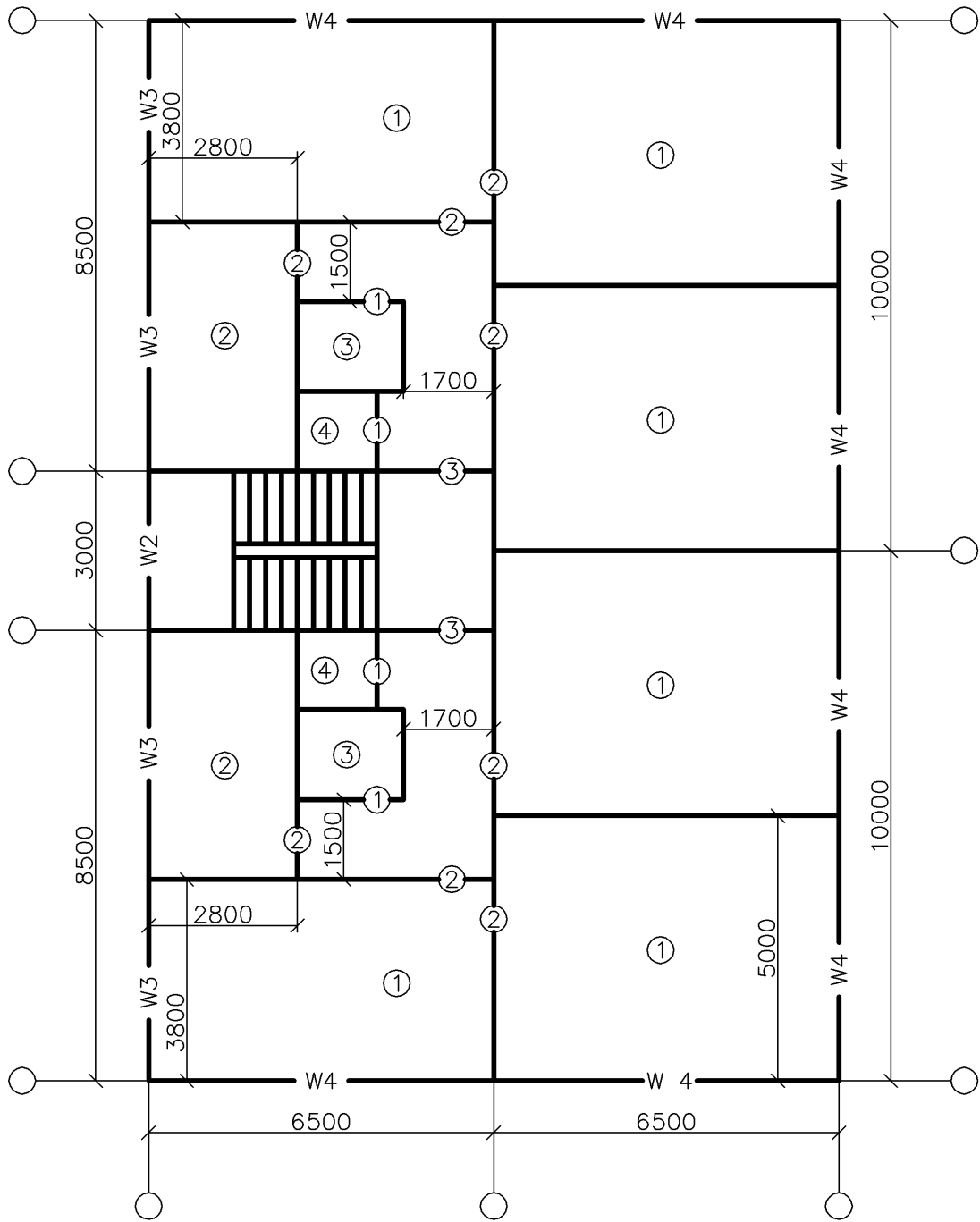
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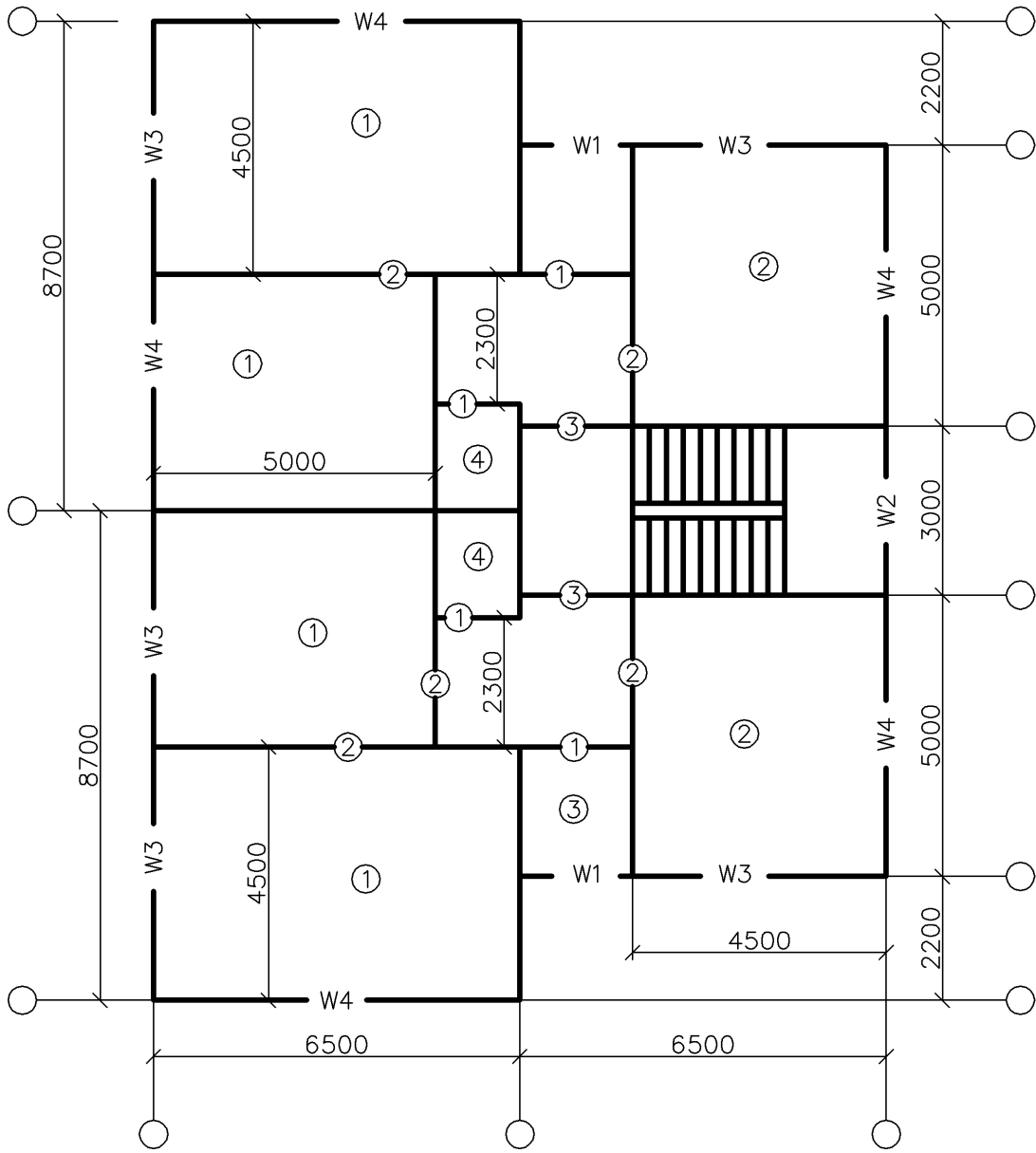
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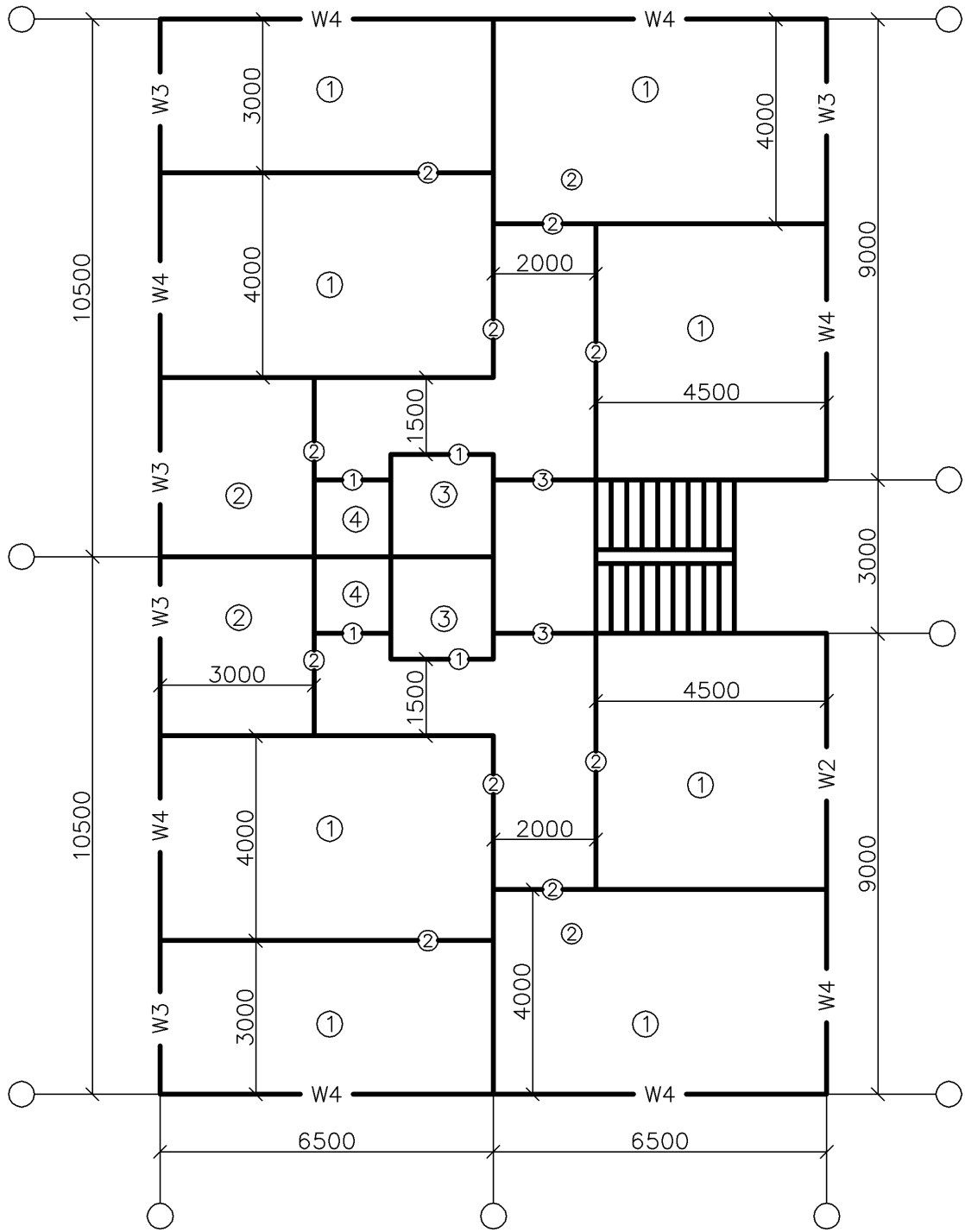


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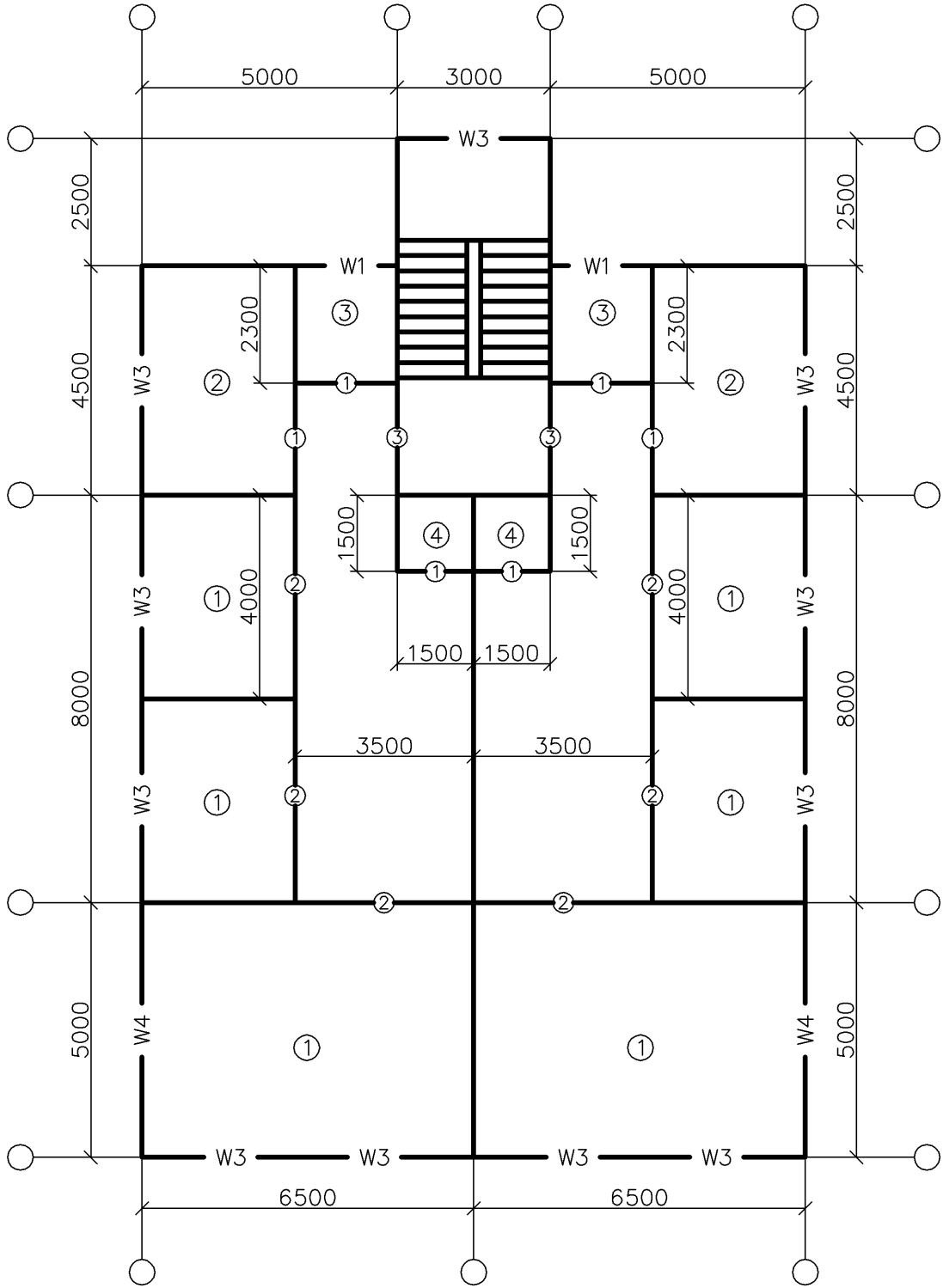


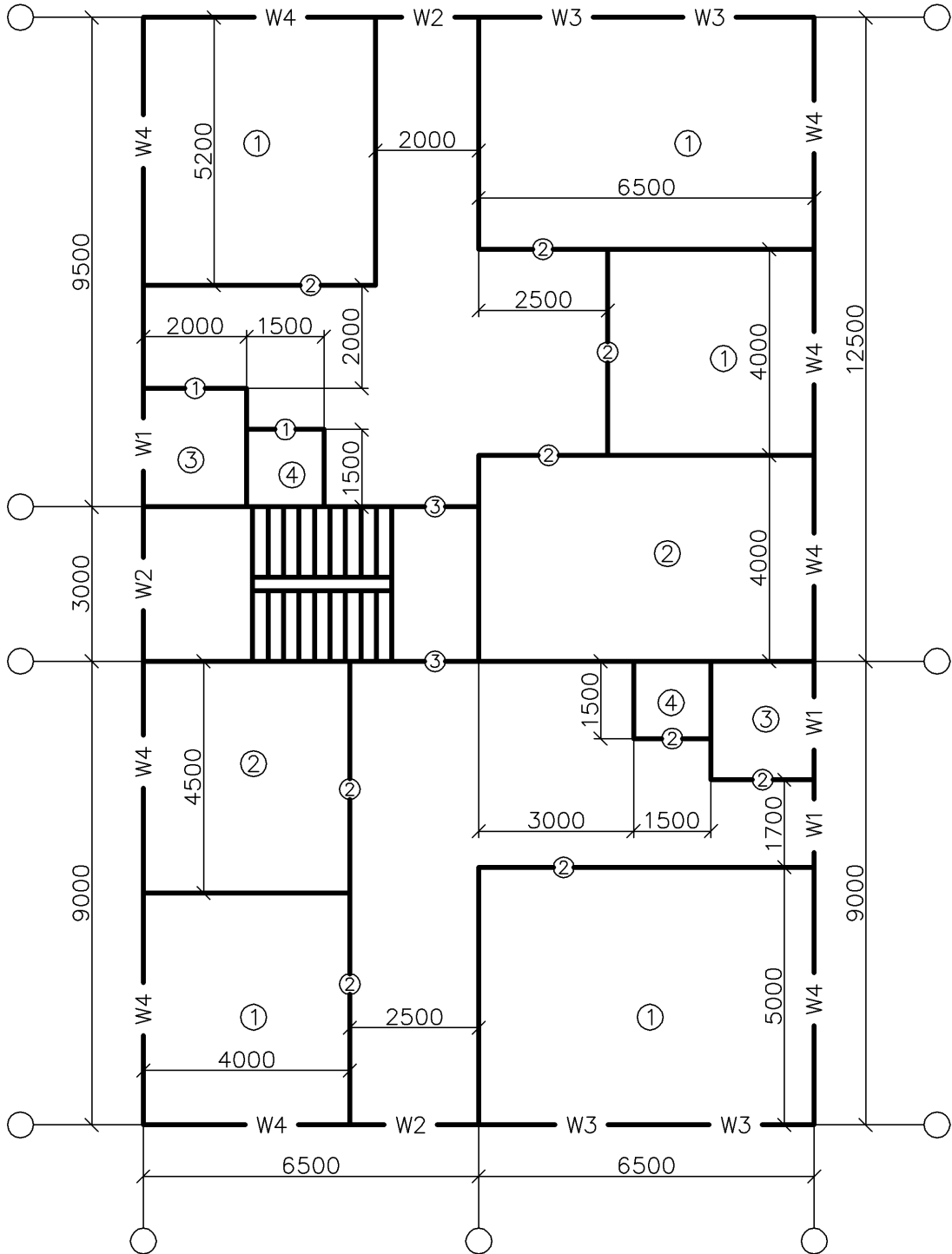
7













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Навчально-методична література

А.І. Пік, О.П. Скиба, Н.Р. Денисюк

# **ВИКОНАННЯ ПЛАНІВ БУДІВЕЛЬ**

Методичні вказівки та завдання до виконання  
графічної і самостійної роботи  
для іноземних студентів  
напряму “Будівництво” з курсу «Інженерна графіка»

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