

## Building contour line in the database of the real estate cadastre in Poland pursuant to applicable laws

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*Abstract.* The study analyzes the provisions of the Polish law concerning the principles of determining the digital description of building contour lines to be entered into the database of the real estate cadastre. The analyzed laws are contained in the Regulation on the register of land and buildings of 2001. The subsequent amendments to this Regulation regarding the contour of a building, made by the entry into force of the amending Regulations in 2013 and 2015, respectively, introduced significant changes. As a result of these changes in the definition of the contour of the building, some of the buildings, entered into the database of the real estate cadastre based on the previous wording of the provisions, became obsolete.

The paper also analyzes the effects of the amendments to the Regulation on the register of land and buildings. Some of them should be considered positive, as the new provisions in the Regulation clarified to some extent the earlier wordings which were unclear and gave rise to ambiguous interpretation of the record data of buildings. However, some important record data of the buildings existing in the database of the real estate cadastre, such as the digital description of the contour lines and the resulting built-up area, became outdated as a result of another part of the amended provisions, although there were no changes in the structure of the buildings.

*Key words:* outline of the building, built-up area, cadastre, update of the database, building contour line

### INTRODUCTION

Cadastral parcel, cadastral entity and building structure, are the main objects of the database of the register of land and buildings, also known as the real estate cadastre. In Poland, the current legislative Act in the field of surveying is Geodetic and Cartographic Law [1]. Article 20.1.2) of this Act lists in general the “*information on their location, purpose, function, and general technical specifications*”, which are necessary to be captured for building structures. One of the examples of secondary legislation to Geodetic and Cartographic Law is the Regulation on the register of land and buildings of 29 March 2001 [4]. It was substantially amended and extended by the amending Regulation of 29 November 2013 [5], but shortly, there was another amendment by the amending Regulation of 6 November 2015 [6]. The issues of creating and using the database of building structures in the real estate cadastre have been the subject of numerous studies, for example [25] [28].

### MATERIALS AND METHODS

This chapter will present the historical basis for entering buildings in the real estate cadastre in Poland. From the analysis of the post-war legal provisions on the register of land and buildings, it appears that the collection of the basic data about building structures was to be implemented already since the end of World War II. The legal acts which are significant for building structures, as well as their short descriptions, are summarized in Table 1.

**Table 1.** Legal acts concerning building structures in the real estate cadastre

Year 1	Title of the legal act 2	Remarks on building structures 3
1947	Decree on the cadastre of land and buildings	The cadastral survey was supposed to contain data on the location of the building, its function, the material used for its execution, the date of its construction and its detailed description.
1955	Decree on the register of land and buildings	It required to collect the same data about the buildings. In addition, it contained the provision that the location of the buildings is the content of the cadastral map.
1969	Decree on land records	It only required to plot the location of the buildings on the cadastral map. It did not, however, contain any provisions concerning the collection of any other data on the buildings.
1996	Regulation on the register of land and buildings	The record data of the building include its location, purpose, function and general technical specifications. The definition of the building was in accordance with the Act of 7 July 1994 - Construction Law [2].

1	2	3
2001	Regulation of 29 March 2001 on the register of land and buildings	14 cadastral data were introduced for the building. The definition of the building was in accordance with the Act of 29 June 1995 on official statistics [3].
2013	Regulation of 29 November 2013, amending the Regulation on the register of land and buildings	26 cadastral data were introduced for the building. There was a change in the definition of the contour of the building. The definition of the building was directly referred to the regulation on the Polish Classification of Types of Constructions [7].
2015	Regulation of 6 November 2015, amending the Regulation on the register of land and buildings	27 cadastral data were introduced for the building. There was another change in the definition of the contour of the building.

The legal acts presented in Table 1 demonstrate how often the Polish legislation regulating the cadastral records of buildings has changed. As a result of these changes and due to the lack of determination to enter the buildings in the real estate cadastre in a consistent manner, in Poland there still are many cadastral districts where the buildings are not entered into the cadastral base at all [8], [14], [24], [26].

In this study, the author will present the selected cadastral data of the building, such as the digital description of the building contour lines and the built-up area of the building which, pursuant to §63.2 of the Regulation on the register of land and buildings, should result from the digital description of the contour. The performed analyses of the Polish legislation and of the specific examples of various architectural and design solutions have demonstrated that there is still a lot of controversy regarding these attributes of the buildings. A negative consequence of such frequent amendments to the law is the loss of coherence of the meaning of the

discussed cadastral data of the buildings, which were entered into the real estate cadastre subject to the previous wording of the provisions in the Regulation on the register of land and buildings.

#### RESULTS AND DISCUSSION

In this chapter, the author will present various buildings which, due to their architectural and design solutions, will serve as examples to illustrate defective and inconsistent provisions in the legislation. The essential definitions of the digital description of the contour of the building and the resulting value of the built-up area of the building are contained in §63 sections 1 and 2 of the Regulation on the register of land and buildings. Basing on the comparative analysis of these definitions in the subsequent amended versions of the Regulation, Table 2 summarizes structural elements of the building which formed its contour, pursuant to the individual versions of §63 of the Regulation on the register of land and buildings [4], [5], [6].

**Table 2.** Comparison of the elements forming the contour of the building

REGULATION ON THE REGISTER OF LAND AND BUILDINGS OF 2001 2001 – 2013	REGULATION ON THE REGISTER OF LAND AND BUILDINGS OF 2013 2013 – 2015	REGULATION ON THE REGISTER OF LAND AND BUILDINGS OF 2015 after 2015
external planes of the outer walls of the ground storey	the exterior walls of the building	the exterior walls of the building
	if the foundation wall intersects the surface - the outer edges of <u>the foundation</u>	if the foundation wall intersects the surface - the outer edges of <u>the walls of the storeys</u> which are supported on these foundation walls
if the storey is on pillars - the exterior walls of the storey supported on these pillars	if the storey is on pillars - the outer edges of <u>the pillars</u>	if the storey is on pillars - the exterior walls of the storey supported on these pillars if the storey is on pillars - the outer edges of the pillars if the storey is on pillars - the outer edges of the walls of <u>the storeys</u> which are supported on the pillars
		if the roof is on pillars - the outer edges of <u>the roof</u>

Table 2 demonstrates that the definition of the contour of the building has evolved with each new amendment to the Regulation on the register of land and buildings. The geometry of the same object recorded in the cadastral database in 2001, 2013 and 2015 looks quite

different. It shows how difficult it is to maintain the database to be continuously compliant with the applicable laws. Further in this article, the author will present some

photos of the buildings whose contours will be used to illustrate the issues of changing the definition of the digital description of the contour of the building in the Regulation on the register of land and buildings.

The definition of the contour is relatively easy to visualize if the exterior walls of the building are the extension of the foundation walls (Fig. 1). This case is relatively easy to interpret during field surveys. However, even for such buildings, there are doubts as to the identification of the measurement point of the corner of a building, if insulation on the walls is of considerable thickness and it does not reach the surface of the ground [21]. It should be emphasized that, in accordance with the Regulation on the standards, the corner of the building as the field detail of the first-order accuracy should be determined with an error not exceeding 0.10 m relative to the nearest point of the geodetic control. In the case of thermal insulation, the thickness of its layer together with external plaster often exceeds 0.10 m, which can be a problem in determining the location of terrain details.

Since 2013, a much more controversial case is that of a building where the outer walls are not an extension of its foundation walls and the building has the so-called overhangs (Fig. 2). They can be supported by pillars, or unsupported. The fact of overhangs being supported by pillars is extremely important, as the contours of such buildings, and the resulting built-up area, will differ significantly from each other.



**Fig. 1.** The walls of the building as an extension of the foundation walls (Foto: M. Buško)



**Fig. 2.** Buildings with overhang without pillars and overhang supported by pillars (Foto: M. Buško)

In the case of the building on the top of Fig. 2, the contour of the building will comprise only the surface of the outline of the ground storey of the building, without the existing overhang, despite the fact that the overhang is of significant size. On the other hand, in the case of the building on the bottom of Fig. 2, the contour is determined by the foundation wall together with the outer edges of the pillars supporting the overhang of the building.

A significant change in the definition of the contour contained in the Regulation on the register of land and buildings of 2015, compared to the Regulation on the register of land and buildings of 2013 should be emphasized at this point, if applied to buildings with overhangs supported on pillars. If the contour was defined pursuant to the Regulation on the register of land and buildings of 2013, it would be determined by the outer edges of the pillars supporting the overhang of the building. If, however, the contour was to be defined as set out in the Regulation on the register of land and buildings of 2015, it would be determined by the outer edges of the storey walls in the building, which are supported on the pillars. As far as the building illustrated in Fig. 2 is concerned, this change in the definition of the contour will not change its contour in a significant way, as the outer edge of the pillars is practically the extension of the outer edge of the walls supported on these pillars. However, there are many buildings in which the pillars are situated at a greater distance from the outer edge of the overhang wall, as illustrated in Figures 3 and 4.



**Fig. 3.** Buildings in which the edges of the walls based on the pillars are not their extension (Foto: M. Buško).



**Fig. 4.** The edges of the walls based on the pillars are not their extension (Foto: M. Buško)

To sum up, it is worth emphasizing that according to §63 section 1b of Regulation on the register of land and buildings, in the years 2013-2015, the contour was determined by the outer edges of the pillars, and after

2015 it was defined by the outer edges of the walls supported on the pillars.

The most important change introduced in the Regulation on the register of land and buildings of 2015 is an additional entry in §63 section 1b, concerning the case of the roof of the building being supported on the pillars. In that case, the contour is defined by the outer edges of the roof. It can be presumed that the purpose of introducing such an amendment to the Regulation in 2015 was to unambiguously specify how to define the building contour lines and the resulting built-up area in the case of a specific type of a building such as an open shelter (defined so since 2013) (Fig. 5). This was due to the fact that the definition of the building was directly referred to the Regulation on the Polish Classification of Types of Constructions (Table 1).

Therefore, when the Regulation on the register of land and buildings of 2013 was in force, all the open shelters, regardless of their size and intended use, were entered into the database of the real estate cadastre. However, after the Regulation on the register of land and buildings was amended in 2015, a clarification was introduced in §78, relieving from the obligation to enter open shelters in the real estate cadastre, if their built-up area is up to 50 m<sup>2</sup> and they are located on the parcel with a residential building, or the one intended for residential construction, providing the total number of such open shelters does not exceed two per each 1,000 m<sup>2</sup> of the parcel. It should be emphasized that the effect of entering a building (including an open shelter) in the real estate cadastre is notifying the tax authorities of a change in the data of the register of land and buildings. This results in the obligation to pay a tax on the building. After the Regulation on the register of land and buildings was amended in 2015, the shelters entered into the cadastral database subject to the regulations in force between 2013 and 2015 should have been removed by the authority running the register, as this database became obsolete due to that amendment [12].

The definition of the contour of the building was broadened in the Regulation on the register of land and buildings of 2015. The contour comprised the outer edges of the roof supported on pillars. It was advantageous for the determination of the contours of open shelters. At the same time, however, as a result of this provision, some of the buildings entered into the real estate cadastre under the provisions of the Regulations on the register of land and buildings of 2001 and of 2013, automatically became obsolete with respect to two important cadastral data: digital contour of the building presented on the cadastral map and the built-up area in the descriptive data of the real estate cadastre. Fig. 6 demonstrates the examples of such buildings with the roofs supported on pillars.





**Fig. 5.** Shelter - a special kind of building by PKOB (Foto: M. Buško)

Another major problem regarding the buildings whose roofs are supported on pillars concerns the determination whether the contour of the building comprises all the turn points of the roof around the building, or only those which are located directly above the pillars. If the first of the above solutions is chosen, it must be taken into account that the built-up area of the

building, determined by its roof, will be much greater than the area determined by the elements of the “ground storey” of the building (even including pillars). The second solution will result in the contour of the building not keeping right angles, characteristic for the walls of the building (Fig. 7).



**Fig. 6.** Buildings in which the roof is based on the pillars (Foto: M. Buško)

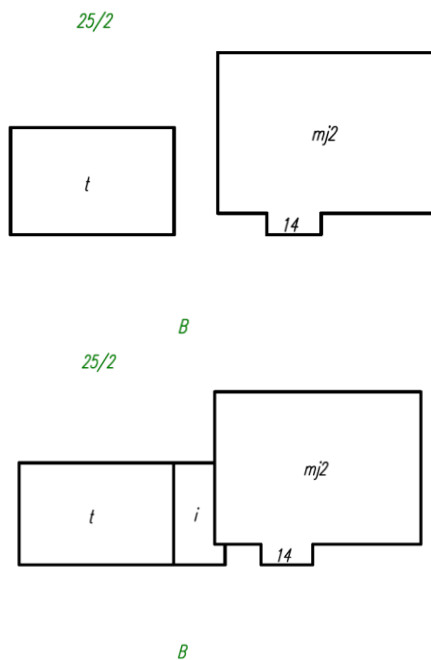


**Fig. 7.** The building with a roof based on the pillars (Foto: M. Buško)

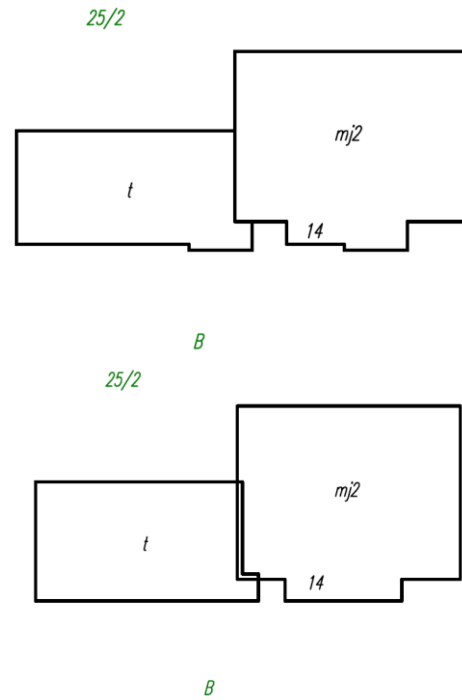
As to the building illustrated in Fig. 7, the analysis was performed, which regarded its presentation on the cadastral map in accordance with the requirements of the Regulation on the register of land and buildings of 2001, 2013 and 2015 (Figures 8 and 9). This will allow to visualize the changes that should be entered into the database of the real estate cadastre for the building which remained unchanged in its construction or design, necessary to be introduced only due to the amendments in the provisions of law. The building was mapped in accordance with the different versions of the Regulation, and for each version the value of the built-up area of the building components was calculated. The results are summarized in Table 4.

As it is illustrated on the Fig. 8, in the version of the Regulation of 2013, the open shelter (“*i*” function on the map) was to be drawn between the garage (“*t*” function on the map) and the residential building (“*mj2*” function on the map). This shelter must be removed from the database (go down in history), pursuant to the provisions of the Regulation of 2015, as shown in Fig. 9. Instead, the contour of the garage will be enlarged, as its roof is supported on the pillar.

The two interpretations of the provisions of the Regulation presented in Fig. 9 are due to the fact that it is impossible to unambiguously resolve whether the whole roof of the building should be measured, or only those parts which are supported on the pillars.



**Fig. 8.** Schematic contours of the building in accordance with the Regulations of 2001 (on the top of Fig. 8) and 2013 (on the bottom of Fig. 8)



**Fig. 9.** Schematic contours of the building in accordance with the Regulation of 2015 – interpretation A and interpretation B

In today's legal status in Poland, the built-up area of a building is not an essential attribute in property tax assessment. Only usable floor space of a building should be taken into account for tax purposes [10]. However, in some areas of the southern Poland, due to some difficulties in determining usable space [11], it is sometimes determined as the product of the built-up area and the number of storeys of the building. This method has no legal grounds, nevertheless, it is commonly used in practice. In addition, for the owners, the value of the built-up area of the building is a very specific and clear attribute. It is expected that any changes in the value of the built-up area, despite the lack of any changes in the construction or design of the building, will result in property owners' protests, formulated as objections to the draft record of survey and property description made available for inspection. The digital description of the contour of the building and the resulting built-up area are also important factors in the currently evolving concepts of the 3D cadastre [9], [16], [18], [23], [27]. Therefore, no consistency of meaning of these data is of great significance. Updated cadastral data are also important for any digital analysis in spatial planning [13], [15], [22], and in the construction of cadastral data models (Land Administration Domain Model) in the cadastral system of spatial information [17]. The experience of Poland in the construction of the real estate cadastre may be useful also for other countries who are developing such concepts [19], [20].

**Table 3.** The built-up area of the elements of the building in Fig. 7

Function of the building	Built-up area [m <sup>2</sup> ]			
	Regulation of 2001	Regulation of 2013	Regulation of 2015	
			Interpretation A	Interpretation B
Residential building	310	310	324	358
Garage	150	150	196	218
Open shelter	0	50	0	0
<b>The total built-up area</b>	<b>460</b>	<b>510</b>	<b>520</b>	<b>576</b>

### CONCLUSIONS

1. The subsequent amendments to the Regulation on the register of land and buildings of 2001, introduced in 2013 and 2015, resulted in the loss of consistency of meaning of the significant cadastral data of the buildings entered into the real estate cadastre under the previous wording of the provisions in the Regulation, such as the building contour line and the built-up area. These inconsistent amendments resulted in the loss of internal harmonization of the data contained in the database of the real estate cadastre.

2. It should be emphasized that in the revised version of the Regulation on the register of land and buildings of 2015, the wording of §63.1b was amended in such a way that the contour of the building is no longer determined by *the outer edges of the pillars*, but by *the outer edges of the walls of the storeys supported on the pillars*. This will cause a change in the building contour lines and the resulting value of the built-up area of some buildings.

3. The wording introduced in the Regulation on the register of land and buildings of 2015, which required the contour of the building whose roof is supported on pillars to be defined as *the outer edges of the roof*, is advantageous when it comes to determining the contour of open shelters, which are defined as a special type of building structures. At the same time, chaos appears with regard to ordinary buildings, whose roof is supported on pillars only in certain places.

4. During the next amendment to the Regulation on the register of land and buildings, it is advisable to introduce a separate subclause in §63.1 of the Regulation, whose wording would be as follows: *in the case of a special type of a building structure, such as an open shelter, which is subject to be entered into the database of the real estate cadastre, the building contour line is the line determined by the rectangular projection of the outer edges of the roof onto the horizontal plane.*

### REFERENCES

1. The Law of 17 May 1989. Law in Geodetics and Cartography, Dz. U. 1989, No. 30, Pos. 163, as amended. d. (in Polish).
2. The Law of 7 July 1994. Construction Law, Dz. U. 1994 No. 89, Pos. 414, as amended. d. (in Polish)
3. The Law of 29 June 1995. On official statistics, Dz. U. 1995, No. 88, Pos. 439, as amended. d. (in Polish).
4. Regulation MRRiB of 29 March 2001. On the land and building, Dz. U. 2001, No. 38, Pos. 454 (in Polish).
5. Regulation of MAiC of 29 November 2013. Amending the regulation on registration of land and buildings, Dz.U. 2013 Pos. 1551 (in Polish).
6. Regulation of MAiC of 6 November 2015. Amending the regulation on registration of land and buildings, Dz. U. 2015 Pos. 2109 (in Polish).
7. Regulation of the Council of Ministers of 30 December 1999. On the Polish Classification of Types of Constructions (PKOB), Dz. U. 1999, No. 112, Pos. 1316. (in Polish)
8. **Balawejder, M., Buśko, M., Cellmer, R., Juchiewicz-Piotrowska, K., Leń, P., Mika, M., Szczepankowska, K., Wójciak, E., Wójcik-Leń, J., Żróbek, S., 2015.** The current problems of real estate management in Poland against the background of organizational and legal changes. WSI-E, Rzeszów. (in Polish)
9. **Bieda, A., Bydłosz, J., Dawid, L., Dawidowicz, A., Głanowska, M., Gózdź, K., Przewięźlikowska, A., Stupen, M., Taratula, R., Żróbek, R., 2015.** Directions of real estate cadastre development. Wyższa Szkoła Inżynieryjno-Ekonomiczna, Rzeszów. (in Polish)
10. **Bieda, A., Hanus, P., Jasińska, E., Preweda, E., 2014.** Accuracy of determination of real estate area, in International Conference "Environmental Engineering, May 22–23, 2014, Vilnius, Lithuania.
11. **Buśko, M., 2015.** Analysis of legal provisions regarding the determination of usable floor area of a building and living premises. Przegląd Geodezyjny, R. 87 nr 12, Warszawa, s. 8–12. (in Polish)
12. **Buśko, M., 2016.** Analysis of the influence of amendments to the legal provisions relating to building structures on keeping the real estate cadastral database updated. Infrastructure and Ecology of Rural Areas, ISSN 1732-5587, Nr II/1/2016, s. 395–410. (in Polish)
13. **Cagdas, V., Stubbjaer, E., 2016.** Core immovable property vocabulary for European linked land administration, SURVEY REVIEW, Volume: 47, Issue: 340, Pages: 49-60.
14. **Dawidowicz, A., Żróbek, R., 2014.** Analysis of concepts of cadastral system technological development. Conference Proceedings. 9<sup>th</sup> International Conference "Environmental Engineering", Vilnius, Lithuania.
15. **De Smet, F., Teller, J., 2016.** Characterising the Morphology of Suburban Settlements: A Method Based on a Semi-automatic Classification of Building Clusters, LANDSCAPE RESEARCH Volume: 41, Issue: 1, Pages: 113-130.

16. **Ho, S., Rajabifard, A., Kalantari, M., 2015.** Invisible' constraints on 3D innovation in land administration: A case study on the city of Melbourne, *LAND USE POLICY*, Volume: 42, Pages: 412-425.
17. **Kalantari, M., Dinsmore, K., Urban-Karr, J Rajabifard, A., 2015.**A roadmap to adopt the Land Administration Domain Model in cadastral information systems, *LAND USE POLICY*, Volume: 49, Pages: 552-564.
18. **Karabin, M., 2013.**Konsepca modelowego ujęcia katastru 3D w Polsce. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa (in Polish).
19. **Kovalyshyn O., Gabriel Yu., 2014.** Development of a management systems model of automatic control by using fuzzy logic.*ECONTECHMOD.LubinRzeshov*, Vol. 3. No. 4, 63-68. (in Polish)
20. **Kovalyshyn O. Kryshenyk N., Havryshkiv N., Sosnowski S., 2014.** Analysis of methodological approaches to evaluation of land quality in Ukraine.*ECONTECHMOD.Lubin-Rzeshov*, Vol. 3. No. 4, 97-102. (in Polish)
21. **Krzyżek, R., 2015.**Innovative algorithm of vector translation method for the measurements of corners of building structures using RTN GNSS technology. *Geomatics and Environmental Engineering*, vol. 9 no. 4, s. 73–84
22. **Kunze, C., Hecht, R., 2015.**Semantic enrichment of building data with volunteered geographic information to improve mappings of dwelling units and population, *COMPUTERS ENVIRONMENT AND URBAN SYSTEMS*, Volume: 53, Pages: 4-18
23. **Lee, B.M., Kim, T.J., Kwak, B.Y., Lee, Y.H., Choi, J., 2015.**Improvement of the Korean LADM country profile to build a 3D cadastre model, *LAND USE POLICY*, Volume: 49, Pages: 660-667
24. **Luczyński, R., 2014.**Modernization of land and buildings registration in terms of the requirements of the modern cadastre. K. Sobolewska-Mikulska (Ed.), *Real estate management and cadastre. Selected problems.* Publishing House of Warsaw University of Technology, Warsaw (in Polish).
25. **Mourafetis, G., Apostolopoulos, K., Potsiou, C., Ioannidis, C., 2015.**Enhancing cadastral surveys by facilitating the participation of owners, *SURVEY REVIEW*, Volume: 47, Issue: 344, Pages: 316-324
26. **Siejka, M., Ślusarski, M., Mika, M., 2015.**Legal and technical aspects of modernization of land and buldingscadastreIn selected area. *Reaports on Geodesy and Geoinformatics*, vol. 99/2015, pp.44-53
27. **Siejka, M., Slusarski, M., Zygmunt, M., 2014.** 3D+time Cadastre, possibility of implementation in Poland, *SURVEY REVIEW*, Volume: 46, Issue: 335, Pages: 79-89
28. **Zupan, M., Lisec, A., Ferlan, M., Čeh, M., 2014.**DEVELOPMENT GUIDELINES IN THE FIELD OF LAND CADASTRE AND LAND ADMINISTRATION, *Geodetskivestnik* Vol. 58 (2014), No. 4, Pages: 710-723.