ISSN 1330-3651 (Print), ISSN 1848-6339 (Online)
UDC/UDK 711.1:528.421

PLANNED SIZE OF A FAMILY HOUSE PLOT IN THE WORLD BETWEEN 1952 ÷ 1992

Amorino Poropat

Subject review
This article synthesizes the planned size of the family house plots in the world. Its aim is to determine the general size of numerical dimensions within which the creative freedom in architecture is possible when designing the preliminary solutions for family houses. A sample of family house building plots was analyzed throughout 91 urban examples in order to determine the ranges of its sizes for the development of a plot in the family house typology. The sizes of the analysed single family house differ considerably. The results obtained in this research may be used in producing Detailed urban plans and serve as a solid basis for further scientific research.

Keywords: *family house plot, planned size*

Planirane veličine parcela obiteljskih kuća u svijetu između 1952. ÷ 1992.

Pregledni članak
Ovaj članak obrađuje veličine planiranih rješenja obiteljske kuće u svijetu. Cilj je utvrditi okvirne veličine brojčanih mjera unutar kojih je moguća kreativna sloboda arhitektonskog stvaralaštva u izradi preliminarnih rješenja obiteljskih kuća. Obrađen je uzorak građevinskih parcela obiteljske kuće iz 91 urbanističkog rješenja. Utvrđeni su rasponi veličina brojčanih mjera za izgradnju parcele u tipologiji obiteljske kuće. Veličine obrađenih tipova obiteljske kuće se znatno razlikuju. Ovi rezultati mogu koristiti u izradi Detaljnih planova uređenja, a ujedno su solidna podloga za daljnja znanstvena istraživanja.

Ključne riječi: *parcela obiteljske kuće, planirane veličine*

1 Introduction

This investigation is focused on determining the medium size of building plot numerical measurements for a single family house typology. This article was inspired by two main sources: the experience in preparing, conducting and monitoring plans for building of a single family house plot and the orientation towards the medium spatial development of family structures in theory and practice. The up-to-date practice in determining the size of the family house is based on various house construction types and dimensions. Construction type defines the layout of the house and its position on the plot, so called house-plot relation. The position of the house within the plot can be: apart from side plot edges, attached to one or more of them, and in some cases the plot can be completely occupied by the building. Stylization modalities of the house position exist. In relevant literature, dwelling in the family house can be defined by:

- the type of house connection (Croatian): free-standing house, house in a row, semi-attached house, two- and three-side attached house [1];
- the type of the house construction on the plot (Croatia): detached house, single attached, double attached, triple attached and quadruple attached house [2];
- the type of building (Italian): open, semi-open and closed type of building [3];
- the type of a single family house (German): free-standing house, duplex-house, house in a row, courtyard house [4]; and especially,
- courtyard type, especially well-known in China: "Feng-Shui, Models Structured Traditional Beijing Courtyard Houses" [5].

The above mentioned papers you cannot be specified or generalized on a medium size of planned building for a particular type in a certain period. It is difficult to define a unique and universal planning methodology that would preserve all the sizes of a certain PLACE. Consequently, this article is focused on Detailed urban plans and revealing one of the elements of Place identity – size of a building plot. In preparing Detailed Management Plans, Croatian authorities impose different parameters for the plot construction. Important measures are coefficients such as fixed sizes or as percentages of the plot built-up. Fixed coefficient sizes cause difficulties for architects in developing conceptual design projects, and in the case of exceeding local authorities suspend the issuance of building conditions and formal documentation. Some measures are expressed only in the percentage of the plot size, particularly in the case of recently built structures, and when the same is realized, additional measurements (higher percentage of the built-up plot area), which do not respect those determined previously, are included in the revision of urban plans. This can sometimes lead to the extension of the plot area built usability up to nearly 100 %. Where is the problem? How to determine the range of the medium size of numerical measurement for a particular family house type within a certain period? It implies the determination of the size limits for a house and a plot which would provide a framework for a flexible and creative freedom of family house plot development, as well as a limiting rule for investors and planners. In this way the pressure for enlarging the plot area usability can be significantly reduced, and attention can be focused towards landscape and vegetation preservation, as a part of the recreational plot area meant for relaxation and improvement of the quality of life for house users (household members). In such a way, we aim to deepen and elucidate new scientific knowledge which includes numerical measurements and their mutual differences in the family house typology. This research is recent, since it discovers the unknown in the way of the family house size determination enhancing thus

significantly the current planning for the benefit of current and future generations.

2 Methodology

The synthesis method or determination of medium sizes was applied for: houses, plots and accommodation capacity. Gradual work comprises: a building plot sample, data for measurements and spatial indicators.

2.1 Building plot sample

For this research a building plot sample was selected from 91 urban plans with data on the size of a single family house within the period between 1952 and 1992. The sample material is based on the synthesis of data from the typology in the world for 89 urban plans and the same number of conceptual designs for a family house, supplemented with two urban solutions from Croatia. The sample includes the overview of types, authors and urban solutions.

2.1.1 The family house type

The family house type can be observed from a number of aspects. One way, for sure, is the type itself as elaborated and studied by architects Cambi et al. [6] this being also the subject of our research. For their research they have chosen a square-shaped house plot. Within this plot they have emphasized the house parts for *day* and *night sections*, along with the appertaining open space (patio). The types classified and analyzed in this way became the basis for further research, namely, the research of the plot and the plot building area for the house development.

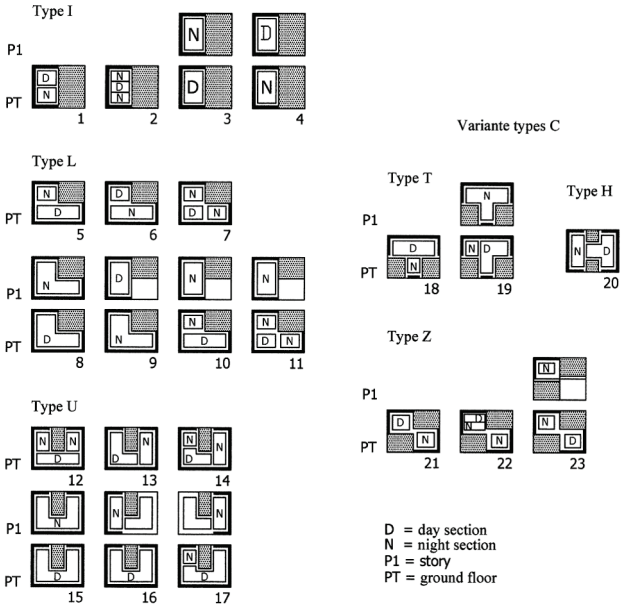


Figure 1 Family house Types in relation to house parts with day and night usage (Cambi et al. 1992)

When the unit consisting of the day and night house sections and appertaining patio is presented as a drawing, it looks like a particular letter. The enclosed drawings represent the standardized houses (within the etalon shape – the square) which shape reminds us of the capital letter I, L, U, and variants of C type (T, H, Z) (Fig. 1).

The authors of conceptual designs:

Type I: Conceptual designs of a family house are excerpts from urban solutions of the authors: Jacobsen, Arne. 1955. Soholm 1, Klampenborg, Danimarka; Barth, Alfons. 1956. Niedergösgen, Basilea, Svizzera; Korhonen, Toivo. Laapotti, Jaakko. 1956. Tonttukallio, Espoo, Finlandia; Ludwig, Eduard. 1958. Quartiere dell' Esposizione Universale, Bruxelles, Belgio; Kristennsen, E. 1959. Grenhusene, Hvidovre, Danimarka; Badani, Daniel. 1960. Abidjan, Costa D'Avorio; Udsen, Berteland et al. 1963. Kuben, Øverod, Danimarka; Leaker, D. R. et al. 1963. Ravenswood 5, Cumbernauld, Gran Bretagna; Phippen, Peter et al. 1968. Turnpike, Crawley, Gran Bretagna; Harju, E. Karjalainen, H. 1969. Pyykösjärvi, Oulu, Finlandia; Kauria, Risto. 1970. Välitalontie, Helsinki, Finlandia; Gabetti, Roberto, Oreglia d'Isola, Aimaro. 1973. Rezidenziale Ovest, Ivrea, Italia; Jaenecke, Fritz. Samuelson, Sten. 1973. Falsterbo, Malmö, Svezia; Smith, Neill. et al. 1973. Sacramento, California, Stati Uniti; Fraser, Jan. et al. 1974. Ealing, Londra, Gran Bretagna; Bonolha, P. Sandovski, W. 1976. Quiririm, Taubate, Gran Bretagna; [6]. Marinović, A. et al. 1975, Varvari, Croatia.

Type L: Conceptual designs of a family house are excerpts from urban solutions of the authors: Libera, Adalberto. 1954. Quartiere Tusculano, Roma, Italia; Frey, Klaus. 1955. Winkelhäuser, Trier, Germania; Ostin, Ake. 1957. Trappfonstret, Högdalen, Svezia; Kongeter, W. Arns, W. 1958. Vöpelswese-Mixsiepen, Remscheid, Germania; Spengelin, Friedrich. et al. 1958. Denickestrasse, Hamburg, Germania; Wils, S. et al. 1959. Elbruchpark, Holthausen, Germania; Jaenecke, Fritz., Samuelson, Stern. 1960. Stichstrassen, Nilstrop, Svezia; Danzeisen, Heinrich., Voser, Hans. (1960), Biserhof, St. Georgen, Svizzera; Gogois, Bernard et al. 1960. Les Cicognes, Valenciennes, Francia; Low, Ulrich. et al. 1961. Im Gartenhöfen, Reinach, Svizzeria; Gullichsen, Kristian. 1962. Kaumismaki, Pihlava, Finlandia; Laapotti, Jakko. 1962. Bergasa, Espoo, FinlanDIA; Utzon, Jörn. 1963. Terrasserne, Fredensbong, Danimarca; Korhonen, Toivo. 1963. Mäntykallio, Espoo, Finlandia; Frey, Klaus. 1963. Maria-Hof, Trier, Germania; Neylan, M. 1963. Bishopsfield, Harlow, Gran Bretagna; Kandilis, G. et al. 1964. Belle Fontaine, Toulouse-Le-Mirail, Francia; Whitfield Lewis, H. J. et al. 1964. Ravenscroft Road, West Ham, Gran Bretagna; De Onzono, Jose. et al. 1964. Cano Roto, Madrid, Spagna; Wilms, S. et al. 1965. Langefeld, Düsseldorf, Germania; Weinbrenner, Eberhard., et al. 1966. Rossdorf, Nürtingen, Germania; Davies Antony, B. et al. 1967. Laindon, Basildon, Gran Bretagna.; Bicknell, H. Hamilton, G. 1967. Staff Collegge Houses, Camberley, Gran Bretagna; Swensson, Knud. et al. 1968. Albertslund Syd, Herstederne, Danimarca; Kollandsrud, Gullik e Mari. 1968. Solvagen, Oslo, Norvegia; Erskine, Ralph. 1970. Esperanza, Landskrona, Svezia; Whitfied Lewis, H. J. 1970. Gloucester Atreet, Sheffield, Gran Bretagna; Kormann, W. Indermühle, u: 1971. Schwabstrasse, Berna, Svizzera; Heliovaara, Mikko e Marianna. 1971. Soukka, Espoo, Finlandia; Berning, Erwin. 1971. Kettwig, Essen, Germania; Seligmann, Werner., et al. 1972. Elm Street, Ithaca, Stati Uniti;

Bakema, J. B., Van den Broek, J. H. 1973. Het Hool, Eindhoven, Olanda; Alberts, A. 1973. Meerzicht – West, Zoetermeer, Olanda; Eller, Fritz. et al. 1974. Büttgen-Vorst, Düsseldorf, Germania; Ramalho, Pedro. et al. 1976. Rua Das Antas, Oporto, Portogallo; Runcorn Dev. Corp. 1976. Castlefields, Runcorn, Gran Bretagna; Vatel, Jean-Pierre. 1978. Le Chateau 1, Villeneuve D'ascq, Francia; Vatel, Jean-Pierre. 1978. Le Hameau 6, Villeneuve D'ascq, Francia; [6]. Marinović, A. et al. 1975. Vranići – Gulići, Croatia.

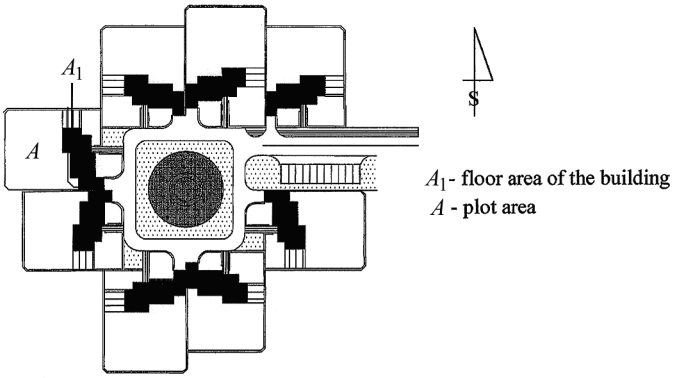
Type U: Conceptual designs of a family house are excerpts from urban solutions with the authors: Gieselmann, Reinchard. 1961. Am Teppichäuser, Karlsruhe, Germania; Jacobsen, Arne. 1961. Bellevue Bugt, Klampenborg, Danimarca; Kammerer, Hans. Belz, Walter. 1962. Stetten, Remstal, Germania; Ahola, Penttti. 1965. Hakalehdon, Tapiola, Finlandia; Chun Wong, Yau. 1966. Hyde Park, Chicago, Stati Uniti; Erskine, Ralph. 1969. Clare Hall, Cambrige, Gran Bretagna; Møller, Juul. et al. 1970. Eremitageparken, Lyngby-Tarbaek, Danimarca; Studio Takeuchi. 1972. Hirakata, Osaka, Giappone; Geiger, F. et al. 1972. Insterburgerstrasse, Karlsruhe, Germania; Canali, Guido. Uluhogian, Haig. 1973. Cooperativa Via Zarotto, Parma, Italia; Kikutake, F. et al. 1975. Previ, Lima, PER; Volkamer, J. Wetzel, F. 1976. Ratingen, Düsseldorf, Germania; Neylan ed Hungless. 1977. Setchell Development, Bermundsey, Gran Bretagna; [6].

Type C: Conceptual designs of a family house are excerpts from urban solutions of the authors: Siren, Kaija e Heikki. 1959. Otsolahdentie, Tapiola, Finlandia; Wicheloe, J. et al. 1964, Frome, Somerset, Gran Bretagna; Phippen, Peter. et al. 1964. THE Ryde, Hatfield New Town, Gran Bretagna; Seig, Karl. 1964. Im Ringelsaker, Duisdorf, Germania; Wilms, S. et al. 1965. Langenfeld, Düsseldorf, Germania; Steele, A. et al. 1965. Law Hill, Dundee, Gran Bretagna; Hafner, L., Wiederkehr, A. 1966. Letzibach, Zug, Svizzera; Siren, Heikki e Kalia. 1966. Louhentie, Espoo, Finlandia; Gomez, Roberto., et al. 1968. Timiza, Ciudad Kennedy, Columbia; Gorio, F. et al. 1972. Salivoli Alto, Piombino, Italia; Kauria, Risto. 1972. Laajasalo, Helsinki, Finlandia; Low, Ulrich. et al. 1972. Muhleboden, Therwil, Svizzera; Storgard, J.P. Orum-Nielsen, J. et al. 1974. Galgebakken, Copenhagen, Danimarca; Siren, Heikki e Kaija. 1975. LA Pierrefitte, Boussy-Saint Antoine, Francia; Deilmann, Harald. et al. 1976. Nienberge, Stuttgart, Germanija; MAA, Mangor e Nagel. 1976. Boelholm, Stenlose, Denimarca; [6].

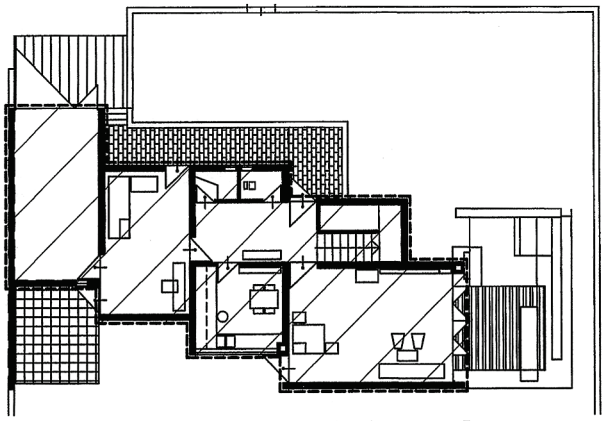
2.2 Urban design building plot proposal

The planning solution of a part of the residential community named Varvari (Croatia) was chosen.

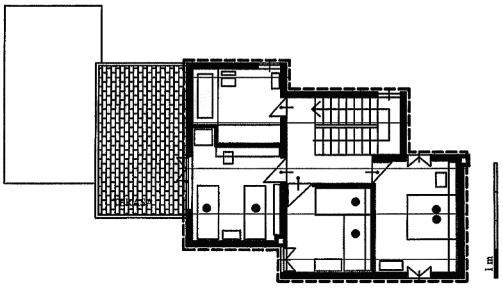
This urban design proposal is a family house conceptual design example classified as type I, an example of measurements reading modality for other conceptual design types, such as L, U, and C. In an urban plan it is often the case that the number of the plots for a given zone, block or cluster corresponds to the number of family houses of the same size. The majority of family house conceptual designs imply flat roofs, while only a smaller part includes slope roofs. Larger number of designs in closed areas lacks additional utility buildings (garages, storages, etc.), and in open space parking, garbage disposal, and similar. Plot areas are of small dimensions, so the open space (vegetation and landscape arrangement) serves more as decoration, and less for residence. More open space on a plot means more vegetation and recreation area which can improve the quality of life.



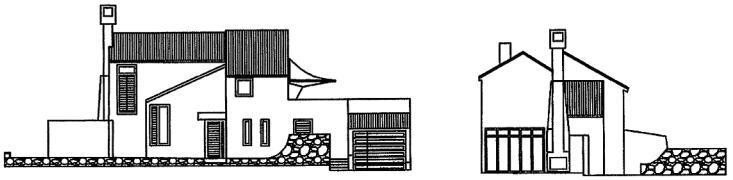
2.1 Cluster of plots



2.2 Ground floor plan, house type I



2.3 First floor plan, house type I



2.4 Street and side facade

Figure 2 Conceptual designs of a family house of the type I, Marinović, A. et al. 1975, Varvari, Croatia

Residential community Varvari was planned for the development of family houses grouped into several plot clusters. One of the clusters is shown in Fig. 2.1, (Fig. 2.) and a detailed presentation of measurements is elaborated in Fig. 3. Each plot includes a conceptual house design (floors: ground floor, the first floor, etc.), from which basic measurements (width, length, floor area), and number of beds can be read off.

2.3 Spatial indicators

Spatial indicators are designations (symbols) for numerical measurements which conditionally replace the house or building conceptual design. The presentation of numerical measurements is very important for producing an urban plan. In Detailed Urban (Development) Plan (DUP), the main Spatial Numerical Measurement Indicators (SNMI) are: plots, coefficients, floors, and accommodation capacity.

2.3.1 Plots

In order to identify the numerical measurements, a plot/house drawing was produced. From the drawing, basic measurements such as widths, lengths, number of beds and floor area can be read off. Detailed presentation of dimensions of the built-up area (A_1) and the plot area (A), and labels for widths (a) and (c), and lengths (b) and (d) on a related plot area are shown in Fig. 3.

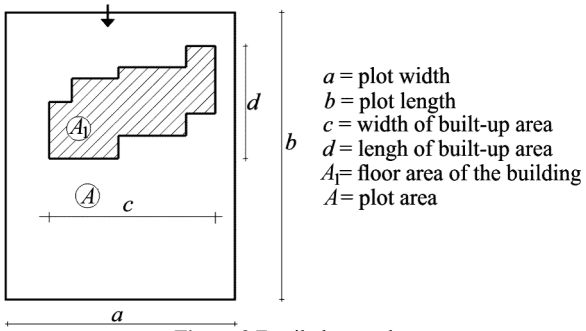


Figure 3 Family house plot

As it can be observed from the measurements for width (a) and length (b) in this presentation and other graphical drawings in the given sample, most of the plots are perpendicular. In case when a plot is irregular in its shape, medium dimensions of a plot (a and b) are taken into account, while for a built-up area the largest width (c) and length (d) are taken into calculation, regardless of the shape of a building. Actual dimensions of a building plot area and area in the layout (A_1) and total floor area of the building (A_B) are also taken into account. In the case of some additional, not connecting built-up areas on the plot, the maximum length and width of the basic development (house) is measured, while the additional areas are marked down separately for additional buildings (garage, storage, etc.).

2.3.2 Coefficients

Notional, in physics, the coefficient is a "constant of proportionality connecting two different sizes" [7]. The relations of measurements for proportionality are the build-up area of the building (A_1) or the total floor area (A_B) in the numerator, and the plot area (A) in the denominator. Two different coefficients can be distinguished: Built-up Coefficient and Usability Coefficient [8]. According to the existing Regulation in Croatia [9], the coefficients are obligatory spatial indicators through which the measurements for their application are specified. In this way, the build-up area (A_1) is the area comprising the vertical projection of all closed, open, and covered structural parts of a building, except balconies, onto the plot, including the terraces at the ground floor when they are structurally part of the underground level (Fig. 2.2).

Approaches concerning the usage of the coefficients are different around the world. In Germany, the build-up coefficient GRZ (Grundflächenzahl) and the usability coefficient GFZ (Geschoßflächenzahl) correspond to the expressions of coefficients presented with mathematical formulas (1) and (2). Mentioned coefficients are used as maximum numerical measurements [4]. In Netherlands, the term "terrein-index" is used, which is the ratio between the building plot area and the total floor area within a building [8]. In Italy, the relation between the building volume and the land area is used [10]. Different approaches in defining coefficients exist, where these are designated by letters and numbers, or textually for each single plot, without elaboration of formulas for medium (average) coefficient size.

Built-up coefficient
It determines the ratio of the built-up land surface underneath the building and the total land surface area in the scope of the building plot and can be illustrated by the following mathematical phrase:

$$K_{\text{izg}} = \frac{A_1}{A} \leq 1, \tag{1}$$

where:
K_{izg} – built-up coefficient of building plot, –
A_1 – built-up land surface area underneath the building, m^2
A – land surface area of building plot, m^2.

Usability coefficient
It determines the ratio of total (gross) fully built building surface area and the surface area of the building plot and can be illustrated by the following mathematical phrase:

$$K_{\text{isk}} = \frac{A_B}{A} = \frac{\sum_1^i A_{1,i}}{A}, \tag{2}$$

where:
K_{isk} – usability coefficient of building plot, –
$\sum_1^i A_{1,i} = A_{1,1} + A_{1,2} + A_{1,i} = A_{\text{B}}$ – total gross building surface area, m^2
i – ordinal number of storeys (1, 2, ...)
A – same as per equation phrase (1).

Medium built-up coefficient
It determines the ratio from the sum of fully built-up land surface areas underneath the buildings and the sum of the related plots surface areas.

$$K_{\text{izg}}^{\text{sr}} = \frac{\sum_{1}^{j} A_{1,j}}{\sum_{1}^{j} A_{(j)}} \leq 1, \quad (3)$$

where:
$K_{\text{izg}}^{\text{sr}}$ – medium built-up coefficient of building plot, –
$\sum_{1}^{j} A_{1,j} = A_{1,1} + A_{1,2} + A_{1,j}$ – sum of built-up land surface areas underneath buildings, m^2
$\sum_{1}^{j} A_{(j)} = A_{(1)} + A_{(2)} + A_{(j)}$ – sum of land surface areas of building plots, m^2
(j) – ordinal building number (house) and ordinal number of building plot.

Medium usability coefficient
It determines the ratio from the sum of total (gross) number of fully built building surface areas and the sum of the surfaces of the related plots.

$$K_{\text{isk}}^{\text{sr}} = \frac{\sum_{1}^{j}\sum_{1}^{i} A_{1,ij}}{\sum_{1}^{j} A_{(j)}}, \quad (4)$$

where:
$K_{\text{isk}}^{\text{sr}}$ – medium usability coefficient of the building plot, –
j, i – same as per equation phrases (2 and 3).

2.3.3 Floors

A family house may consist of one to two above ground floors including the attic. Depending on the terrain configuration, floors may include ground floor, basement, cellar and attic. Total height of all floors (the building) is measured from the finally levelled and arranged terrain at its lowest part on the façade wall of the building up to the highest point of the roof (apex, roof ridge).

2.3.4 Accommodation capacity

The family house *accommodation capacity* implies the number of beds within, so called, night section of the house. It usually corresponds to the number of household members (residents) that are parents and children.

3 The size of a planned family house plot around the world

As the research results, average sizes of a planned family house and a plot were derived. According to the type, four groups of urban solutions were determined, differentiated by the shape of a family house building in a layout. Average family house and a plot are rectangular in shape, except for type C, whose family house is square in shape.

3.1 Medium sizes for a building plot

Tab. 1 shows the reviewed numerical measurement dimensions ranges: The medium size for a single family house comprises an area between 236 and 331 m^2, with the appertaining width between 9 and 13 meters, and length between 18 and 33 meters. The medium single family house size has the ground floor area ranging between 90 and 131 m^2, total floor area ranging from 125 and 186 m^2, while the house width is ranging from 8 and 13 meters, and the house length between 13 and 21 meters. The house accommodation capacity is relatively small: it is only for 4 to 6 household members. The average built-up coefficient for a single family house in the typology ranges between 0,35 and 0,51, and the average usability coefficient ranges between 0,49 and 0,67.

The least mean and the longest length has the type U (Fig. 4).

Table 1 The results of numerical measurements average sizes or a planned family house

Type	Urban plan	Medium size									
		Plot			House					House/Plot	
	Number of urban plan	Width a	Length b	Area A	Width c	Length d	Ground floor A_1	Total A_B	Capacity	Medium built-up coefficient $K_{\text{izg}}^{\text{sr}}$	Medium usability coefficient $K_{\text{isk}}^{\text{sr}}$
		m	m	m^2	m	m	m^2	m^2	Number of beds		
I	20	11	22	257	8	13	90	125	4	0,35	0,49
L	41	13	18	236	13	14	122	142	5	0,51	0,60
U	14	9	33	279	9	21	139	186	6	0,50	0,67
C	16	13	27	331	13	17	134	163	5	0,40	0,49

In this work, the range of plot and house sizes was determined for a given period of time in the second half of the 20$^{\text{th}}$ century. It is the time in which the creation of urban plans for family building significantly developed. The sizes of a building plot were based on family house conceptual design. Each house has a rational and functional solution for day and night section. It rationally means that the size of a ground floor area depends on a number of beds. Functionally, it connotes the completion of the number of rooms required for daily residence and

sleeping. These conceptual designs are typified performances.

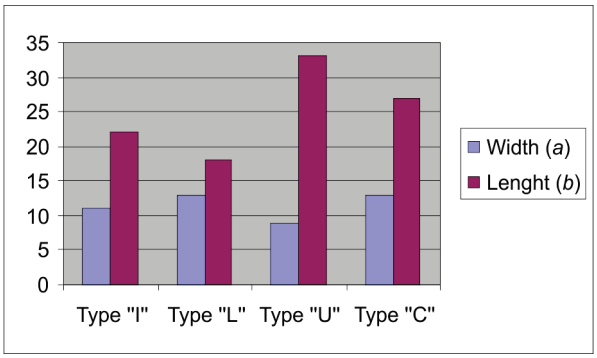


Figure 4 refers to the mean width and length on family house plot

The least surface of the built situation and the family house gross surface on the family house plot of the I type (Fig. 5).

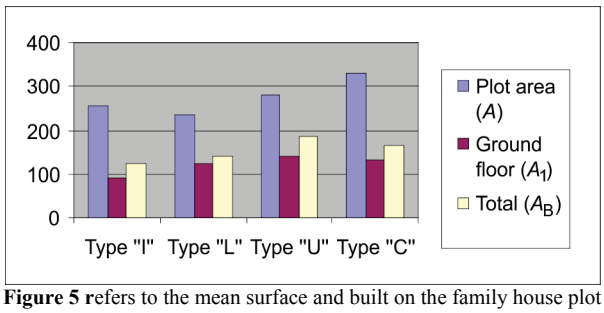


Figure 5 refers to the mean surface and built on the family house plot

The largest mean usage coefficient of the family houses' plot has the type U (Fig. 6).

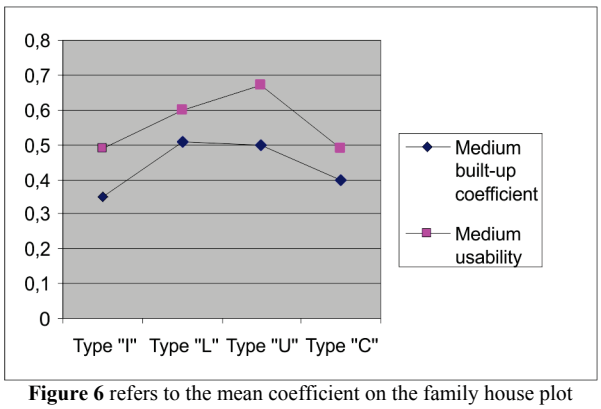


Figure 6 refers to the mean coefficient on the family house plot

According to that, in further research the medium coefficient sizes need to be adjusted to the requirements of the time to come. Today's residents' needs are directed more towards the healthy environment. It implies that closed and open space on a plot need to be evaluated separately. Closed space comprehends basal (day and night section) and additional buildings (garages, storages, water reservoirs, cellars, etc.), while open space comprises the area for regulation of the traffic access (road access, car parking, etc.), and relaxation (greenery-lawn, flower garden, pergola, orchard, etc.)

An example:
Building plot, $A = 350$ m^2
What are the medium sizes of the family house, measured for the layout and total floor area?

$K_{izg}^{sr} = 0{,}35 \div 0{,}51$; $K_{isk}^{sr} = 0{,}49 \div 0{,}67$.

Built-up area of the building(s) in the layout (A_1) is ranging from 125,5 m^2 to 178,5 m^2.
$A_1 = 0{,}35 \cdot 350 = 122{,}5$m^2
$A'_1 = 0{,}51 \cdot 350 = 178{,}5$ m^2.
Total floor area of the family house (A_B) is ranging from 171,5 to 234,5 m^2.

4 Conclusions

In the introductory part of this work, the methodology for data elaboration for types, as well as the graphic interpretation of measurement sizes, was determined. The sizes of elaborated types for a single family house considerably differ.

Ranges of numerical measurements for medium sizes of a building plot in the family house typology were determined for the time period of the second half of the 20th century.

The ranges of coefficient sizes are in favour of a higher built-up area on the plot, but implicate the lack of space required for activities which correspond to the needs of residents nowadays. This is in favour of the reduction of the built-up coefficient size and of the increment of the usability coefficient size and the corresponding plot area.

Determined ranges within the family house plot area allow the freedom for architectural creativity. It connotes more open space on a plot for functional solutions more acceptable for humans.

On the contrary, one fixed size determined by coefficients cannot enlarge nor shrink the area in a layout or the total floor area, and in this way it represses the creative freedom.

However, restriction by the means of a coefficient with a fixed size is desirable in the case of protection of historical monuments, and similar. Medium coefficient is determined for a single type of building (family house, villa, etc.), and for a single type (L, U, etc.) or construction type (detached, single attached, double attached, etc.) on the level of a single location (group of buildings, residential community, etc.).

The expressions by formula for coefficients are universal. In European countries, coefficients are used by architects and urbanisms for elaboration of urban plans and building conceptual designs. These are also used by investors, and especially officers in the bodies of administrative authorities authorized for building requirements, plan implementation and inspection.

This work consolidates the theory and practice of conceptual building sizes of a single family house for a given period of time. It is now enlightened, in practical use, and behind us, but it can be elaborated in the same way for another period of time and other construction areas.

These results could be used in the process of preparing detailed urban plans, and at the same time represent a proper basis for further scientific research.

Acknowledgement

The work presented in this paper is financially supported by the Ministry of Science, Education and Sports of the Republic of Croatia, through a project "Peasant family farm in Istria" [01470103].

5 References

[1] Strižić, Z. O stanovanju, arhitektonsko projektiranje, Biblioteka Psefizma, Nakladništvo udruženja Hrvatskih arhitekata, Zagreb, 1956., 1997., pp. 120-122.
[2] Poropat, A. Prilog pojmovnom i metodološkom pristupu mjerama kućišta – rezultati istraživanja, Međunarodni kongres Energija i okoliš 2000, XVII. znanstveni skup o energiji i zaštiti okoliša, vol. 1, u_B. Franković, Opatija, pp. 291-307.
[3] Rossini, G. Segrè, D. 1982. Tecnologia edilizia, vol 6, Ulrico Hoepli Editore S.p.A., 2000., pp. 32-33.
[4] Prinz, D. Städtebau, Band 1, Städtebauliches Entwerhen, Verlag W. Kohlkammer, Stuttgart, Berlin, Köln Mainz, 1983, 1986, pp. 161-165.
[5] Xu, P. Feng-Shui Models Structured Traditional Beijing Courtyard Houses. // Journal of Architectural and Planning Research, 15, 4(1998), pp. 271-282.
[6] Cambi, E. Di Cristina, B. Balzanetti Steiner, G. Tipologie residenziali con pacio, 4a edizione: febbraio 1992. Be-Ma Editrice Milano, 1981, 1992, pp. I (23-43), L(45-86), U(87-102), C(105-120).
[7] Anić, V. Hrvatski enciklopedijski rječnik, Novi Liber, Zagreb, 2002.
[8] Marinović-Uzelac, A. Teorija namjene površina u urbanizmu, Tehnička knjiga Zagreb, 1989., pp. 61-164.
[9] Pravilnik o sadržaju, mjerilima kartografskih prikaza, obveznim prostornim pokazateljima i standardu elaborata prostornih planova , Narodne novine 106/98, 39/04, 45/04, 163/04, 148/10 (prestao važiti), 9/11.
[10] Colombo, G.; Pagano, F.; Rossetti, M. Manuale di Urbanistica, Il sole 24 Ore Pirola S.p.A. Milano, 1996, pp. 1176-1177.

Author's addresses

Amorino Poropat, Ph.D.
Institut of Agriculture and Tourism of Poreč
Karla Huguesa 8, 52440 Poreč, Croatia
Tel. +385 (0)52 408325
Fax: +385 (0)52431695
E-mail: amorino.poropat@iptpo.hr