

# Variant calculation system – the instrument of economic performance management of a multifunctional agricultural enterprise

*Variantný kalkulačný systém – nástroj riadenia ekonomickej výkonnosti multifunkčného poľnohospodárskeho podniku*

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**Abstract:** The article is focused on the importance of using the variant calculation methods in the management of companies' performance under the conditions of multifunctional agriculture. It mentions the difference between the calculations formed for the needs of valuating the production in the financial statements and the managerial calculations. Attention is paid to overhead costs in agriculture, their development is depicted with tables and graphs. The development of overhead costs during the time period of 1997–2006 is presented in crop production and outputs of wheat and rapeseed, in livestock production in Slovakia and in the outputs of cattle (6–24 months) and pigs (1–12 months). The fastidiousness of market environment of the globalized economies requires a gradual transformation from the classical calculation system into the managerial calculation system, which provides a multidimensional insight into the product as well as the market. The sequence of establishing the variant calculation methods is also introduced together with the reasons of under-valuating calculations in the managerial practice.

**Key words:** classical calculations, managerial calculations, variantness of calculation methods, overhead costs, multifunctionality of agriculture, company's economic performance

**Abstrakt:** Príspevok je zameraný na význam využívania variantných kalkulačných metód v riadení výkonnosti podnikov v podmienkach multifunkčnosti poľnohospodárstva. Poukazuje na rozdiel medzi kalkuláciami zostavovanými pre potreby ocenenia produkcie v účtovnej závierke podnikateľov a manažérskymi kalkuláciami. Pozornosť je venovaná režijným nákladom v poľnohospodárskej prvovýrobe, vývoj ktorých je dokumentovaný tabuľkami a grafmi. Uvedený je vývoj režijných nákladov v rokoch 1997–2006 v rastlinnej výrobe SR a pri výkonoch pšenica a repka olejná, v živočíšnej výrobe SR a pri výkonoch výkrm hovädzieho dobytká a výkrm ošípaných. Náročnosť trhového prostredia globalizovaných ekonomík si vyžaduje postupnú transformáciu klasického kalkulačného systému na variantný kalkulačný systém, ktorý poskytuje multidimenzionálny pohľad na výrobok i na trh. Uvedená je postupnosť zavádzania variantných kalkulačných metód a príčiny nedocenenia kalkulácií v riadiacej praxi.

**Kľúčové slová:** klasické kalkulácie, manažérske kalkulácie, variantnosť kalkulačných metód, režijné náklady, multifunkčnosť poľnohospodárstva, ekonomická výkonnosť podniku

The dynamics and forming of European agriculture are determined by many considerably heterogeneous and complicated processes and trends which influence mutually and moreover they work in a different way in developed and developing countries (Svatoš 2008).

The evaluation of the company's performance does not lose on its importance. It is an often discussed research topic not only in economics, but also in strategic management accounting and finance. According to different resources, there are many reasons for

heterogeneity in the company's performance (Bielik, Rajčániová 2008).

Even in a well performing agricultural enterprise with a very stable base, good reputation and very attractive products both in crops and livestock – in order to keep this enviable status – it is necessary to undertake frequent internal and external environmental analyses (Kudová 2008).

The calculation system denotes a starting point for realisation of the active systemic as well as effective approach to management. It can serve to different single-purpose analyses, however, it becomes the most effective in case it forms a part of a complex system of management respecting the development trends in the enterprise (Tomková 2002).

Economic performance together with the relation to the environment and the relation to rural development form three elementary axes of multifunctionality of agricultural enterprises (Doucha, Foltýn 2008). Under the conditions of agricultural multifunctionality, the variability of calculation methods is important. It requires a quality cost and information system (Kučera et al. 2005).

The development of information systems and technologies secures an effective solution of the production process. For agricultural enterprises, the implementation of a quality software solution constitutes a competitive advantage. However, the user and also his/her abilities to use the information solution for agricultural production process are significant (Látečková, Kučera 2008).

In spite of the existence of the abundant number of methods supporting the decision making processes, their usage is insufficient (Szabo et al. 2008).

## THE AIM, MATERIALS AND METHODS

The goal of the article is to point out the importance of using the variant calculation methods in the management of a multifunctional agricultural company performance.

The following sources were utilised as materials:

- the information gained from scientific and academic publications focused on compiling managerial calculations,
- the Slovak accounting legislation and the International Accounting Standard IAS 2 – Inventories,
- partial outcomes of research assignments in the Department of Information System, the Faculty of Economics and Management in Nitra focused on making the information systems of agricultural enterprises more effective after the EU access,
- information gained from the selected enterprises.

The above mentioned materials were gained and processed by the methods of analysis, selection, comparison, synthesis as well as controlled conversation, time series and flowcharts.

## OUTCOMES AND DISCUSSION

Compiling calculations on the grounds of defining the entries of the calculation scheme is not adjusted accurately to any legislative regulation. The compilation of calculations is regulated only indirectly through the Slovak accounting legislation and the International Accounting Standard (IAS 2 – Inventories) by qualifying the comprehension of direct – individual and overhead costs and their inclusion in the valuation of production that is used in financial statements. Thereby there were established identical regulations concerning the valuation of production in every enterprise in Slovakia and the EU in order to achieve a comparable presentation of outcomes. The valuation of the produced though not sold production has an impact on the degree of profit or loss, which is being transformed into the income-tax base, it means that there are formed identical regulations in order to enumerate the income-tax base, as well.

For the above mentioned accounting and tax purposes as well as for the needs of comparison of profits or losses gained and other indicators between different enterprises, it is crucial to set the identical enumeration regulations. Calculations of production compiled in accordance with the identical regulations serve for various economic studies and research, on the ground of which there are afterwards certain by-laws accepted by the appropriate ministries and government institutions.

Through ensuring the identical enumeration regulations and comparable indicators, it is not possible to respect the particular conditions and specific circumstances of enterprises. Therefore the calculations compiled in accordance with the accounting legislation cannot form a sufficient informative background for decision-making and management. They can lead to improper decisions and threaten the economic performance, even the existence of an enterprise. Under the conditions of constant changes and strong competitive pressure in the frames of the internationalised and globalised economics, managers need proper decisions in order to assure sustainable development as well the so-called managerial calculations.

The majority of agricultural enterprises in Slovakia compile calculations in accordance with the methodology published by the Research Institute of Agricultural

Table 1. The development of direct and overhead cost in crop production in Slovakia within the years of 1997–2006 (SKK/ha of agricultural land)

Indicator	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2006/1997
Direct costs in total	9 028	9 100	8 545	9 302	9 852	10 436	10 734	13 051	12 953	13 240	1.47
Overhead costs in total (PO + AO)	2 337	2 286	2 172	2 209	2 153	2 215	2 117	2 822	2 801	3 005	1.29
production overhead (PO)	1 458	1 287	1 203	1 193	1 198	1 247	1 242	1 645	1 667	1 702	1.17
administration overhead (AO)	879	999	969	1 016	955	968	875	1 177	1 134	1 303	1.48
Total costs	11 365	11 386	10 717	11 511	12 005	12 651	12 851	15 873	15 754	16 245	1.43
% overhead costs from the total costs	20.56	20.10	20.27	19.19	17.93	17.51	16.47	17.78	17.78	18.50	0.90
Of which											
Direct costs in total	12 012	12 310	12 486	12 607	14 341	14 561	14 806	15 416	15 394	16 372	1.37
Overhead costs in total (PO + AO)	3 181	3 012	3 116	2 902	2 943	3 019	2 996	3 413	3 291	3 563	1.12
production overhead (PO)	1 956	1 626	1 702	1 554	1 616	1 636	1 808	2 045	1 941	1 968	1.01
administration overhead (AO)	1 225	1 386	1 414	1 348	1 327	1 383	1 188	1 368	1 350	1 595	1.30
Total costs	15 193	15 322	15 602	15 509	17 284	17 480	17 802	18 829	18 685	19 935	1.31
% overhead costs from the total costs	20.94	19.66	19.97	18.71	17.03	17.27	16.83	18.13	17.61	17.87	0.85
Direct costs in total	14 776	16 176	14 290	15 446	18 581	19 621	21 329	19 295	18 218	18 964	1.28
Overhead costs in total (PO + AO)	3 282	3 593	3 296	3 337	3 670	4 141	3 756	3 751	3 481	3 739	1.14
production overhead (PO)	1 943	1 986	1 823	1 801	2 062	2 758	2 370	2 198	2 057	2 159	1.11
administration overhead (AO)	1 339	1 607	1 473	1 536	1 608	1 383	1 386	1 553	1 424	1 580	1.18
Total costs	18 058	19 769	17 586	18 783	22 251	23 762	25 085	23 046	21 699	22 703	1.26
% overhead costs from the total costs	18.17	18.17	18.74	17.76	16.49	17.43	14.97	16.28	16.04	16.47	0.91

Source: The Research Institute of Agricultural and Food Economics of the Slovak Republic. Costs and income of agricultural products in Slovakia, years 1997–2006; own calculations

Table 2. The development of direct and overhead cost in livestock production in Slovakia within the years of 1997–2006

Indicator	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2006/1997
Direct costs in total	13 866	14 094	13 599	13 631	15 114	16 251	16 295	19 107	17 813	18 606	1.34
Overhead costs in total (PO + AO)	2 890	2 991	2 717	2 637	2 801	2 840	2 765	3 327	3 287	3 377	1.17
production overhead (PO)	1 624	1 573	1 376	1 333	1 551	1 558	1 579	1 744	1 772	1 745	1.07
administration overhead (AO)	1 266	1 418	1 341	1 304	1 250	1 282	1 186	1 583	1 515	1 632	1.29
Total costs	16 756	17 085	16 316	16 273	17 915	19 091	19 060	22 434	21 100	21 983	1.31
% overhead costs from the total costs	17.25	17.51	16.65	16.20	15.63	14.88	14.51	14.83	15.58	15.36	0.89
Of which											
Direct costs in total	3 135	3 295	3 521	3 634	3 585	3 921	3 651	3 974	4 098	4 159	1.33
Overhead costs in total (PO + AO)	721	758	655	769	749	776	744	897	976	988	1.37
production overhead (PO)	414	403	371	409	410	446	452	538	552	535	1.29
administration overhead (AO)	307	355	284	360	339	330	292	359	424	453	1.48
Total costs	3 856	4 053	4 176	4 403	4 334	4 697	4 395	4 871	5 074	5 147	1.33
% overhead costs from the total costs	18.70	18.70	15.68	17.47	17.28	16.52	16.93	18.42	19.24	19.20	1.03
Direct costs in total	1 699	1 681	1 590	1 630	1 885	1 859	1 814	1 917	1 807	1 890	1.11
Overhead costs in total (PO + AO)	307	316	276	297	305	304	294	332	342	336	1.09
production overhead (PO)	178	166	146	151	179	176	178	191	207	194	1.08
administration overhead (AO)	129	150	130	146	126	128	116	141	135	142	1.10
Total costs	2 006	1 997	1 866	1 927	2 190	2 163	2 108	2 249	2 149	2 226	1.11
% overhead costs from the total costs	15.30	15.82	14.79	15.41	13.93	14.05	13.95	14.76	15.91	15.09	0.99

Source: The Research Institute of Agricultural and Food Economics of the Slovak Republic. Costs and income of agricultural products in Slovakia, years 1997–2006; wn calculations.

and Food Economics in Bratislava (RIAFE). The calculations serve economic needs, therefore the methodology respects the accounting, tax legislation as well as the valid Price Law.

The management of multifunctional agricultural enterprises requires besides these calculations the usage of variant calculation methods depending on the particular decision task. Multifunctional agricultural enterprises deal, besides agricultural production, also with the production of the biological base for the production of bio-fuels, realizes different types of industrial production and offer various services. Under such conditions, it is crucial to use several calculation methods in order to make the right decision. These methods serve to compile the calculations of both incomplete and complete (total) costs.

The calculations compiled in the majority of agricultural enterprises, satisfying the accounting and tax legislation, belong to the calculations of complete costs. Overhead costs (common to several outputs) are involved in the calculations by the means of the overhead charge. The lay-out base for the production and administration overheads forms the direct costs. The methodology of the RIAFE warns the enterprises that the obligation to abide it relates only to enterprises belonging to the selected list providing data about the real own costs of agricultural outputs for the needs of the Ministry of Agriculture of the Slovak Republic.

Setting out the overheads proportionally in accordance with a definite lay-out base does not form objective information for decision-making and management. The methodology of the RIAFE states that setting out overhead costs is less objective, therefore it is necessary to include as many costs as possible directly into the output, or in the activity (which are being calculated) as a direct cost only if it is connected to the particular production. However, this is not carried out in the majority of agricultural enterprises. It is not examined in a sufficient way to which output are e.g. travel costs, representative cost, liquidation costs of waste or depreciation charges directly connected. Usually they are encompassed into the production or administration overhead in accordance with the chosen lay-out base, equally for all of the outputs. It causes, for instance that:

- for a product which produces a little waste, there are still incorporated such costs as the liquidation costs of waste caused by the product that produces a large amount of waste,
- for a product which does not pollute the environment, there are also partially included the costs which pollute the environment,
- for a product which has been produced at a high quality, there are enumerated the costs which are

connected to ensuring the quality of a faulty product or the costs of repair under a letter of guarantee concerning the complaining business partner etc.

Therefore, at present it is emphasised that when setting out the overhead costs, the attention should be paid to their environmental nature and the aspect of ensuring the quality of the production, regarding the particular output.

Tables 1 and 2, as well as Figures 1 and 2 depict the level of overhead costs in agriculture within the years 1997–2006.

The percentage of overhead costs in the total costs regarding crop production in Slovakia (Table 1) within the analysed time period ranges from 16.47% to 20.56%. In total, it has a slightly fluctuating tendency: its rate in 1997 was 20.56%, it was gradually decreasing until 2003 to 16.47% and then it was characterized by a slight increase up to 18.5% in 2006.

The percentage of overhead costs in the total costs regarding livestock production in Slovakia (Table 1) within the analysed time period ranges from 14.51% to 17.51%. It has a slightly fluctuating tendency: its rate in 1997 was 17.25%, it was gradually decreasing until 2003 to 14.51% and then it was slightly increasing up to 15.36% in 2006.

It is necessary to express the acknowledgement to the farmers for achieving mastery in reducing the proportion of overhead costs in the total own costs of production despite the input-price increase in the observed period of time.

However, the proportion of overhead costs in the total own costs in agriculture will not be possible to decrease endlessly, since it would threaten the quality of production. Under the influence of the input-price increase, it will be possible to rise their proportion in the total own costs only slightly, as it is shown e.g. after 2003.

The documented proportion of overhead costs in the total own costs in agricultural production is significant enough (by the means of their improper allocation) to result in eliminating the apparently loss-producing product from the production or attaching the unproportionately high efficiency to another product. It should be taken into consideration that a multifunctional agricultural enterprise performs other types of production as well and provides services, at which the proportion of overhead costs in the total own costs can be higher. In this case, the emphasis should be laid on their objective allocation very carefully. The high percentile of overhead costs proportion we can observe for instance in the case of business activities and services.

In order to ensure the long-term prosperity and sustainable development of an enterprise in the com-

petitive environment of globalised economies, under circumstances of the continual and fast changing external surrounding, it is important to use various calculation methods for the efficient economic performance management. Those calculation methods ensure that the costs expended for production can be analysed from different points of view. It can be, for example, from these points of view:

- direct and indirect costs, individual and overhead (static calculations do not respect the changes in the capacity usage, ensuring long-term market price of a product, which should cover the costs and gain profit),
- variable and fixed costs (dynamic calculations connected with the changes in capacity usage, identifying the break-even point, recognising the covering contribution of the product, identifying the short-term lower price boundary of the product),
- costs exerted for the whole production process, in which it is possible to determine the costs connected to production activities and the costs activated by

activities oriented on the customers – purchasers (calculations with the method of ABC – Activity Based Costing),

- costs determined as the cost role for the upcoming period (preliminary calculations of the affectable costs for the needs of the deflection management),
- costs determined to motivate workers to accomplish the defined goal of the company (preliminary calculations for the needs of motivation),
- target costs – derived from the retail price that is accepted by the market as well as from the economic goals of the enterprise (calculations for the strategic cost management, the method of target costing)
- costs connected to the whole life circle of the products – mainly products with the long-term usage (calculations for strategic cost management, the method of Life Time Costing, Cycle Costing),
- costs modified according to the principles of the method EVA – Economic Valued Added (mainly when evaluating the benefits of investments).

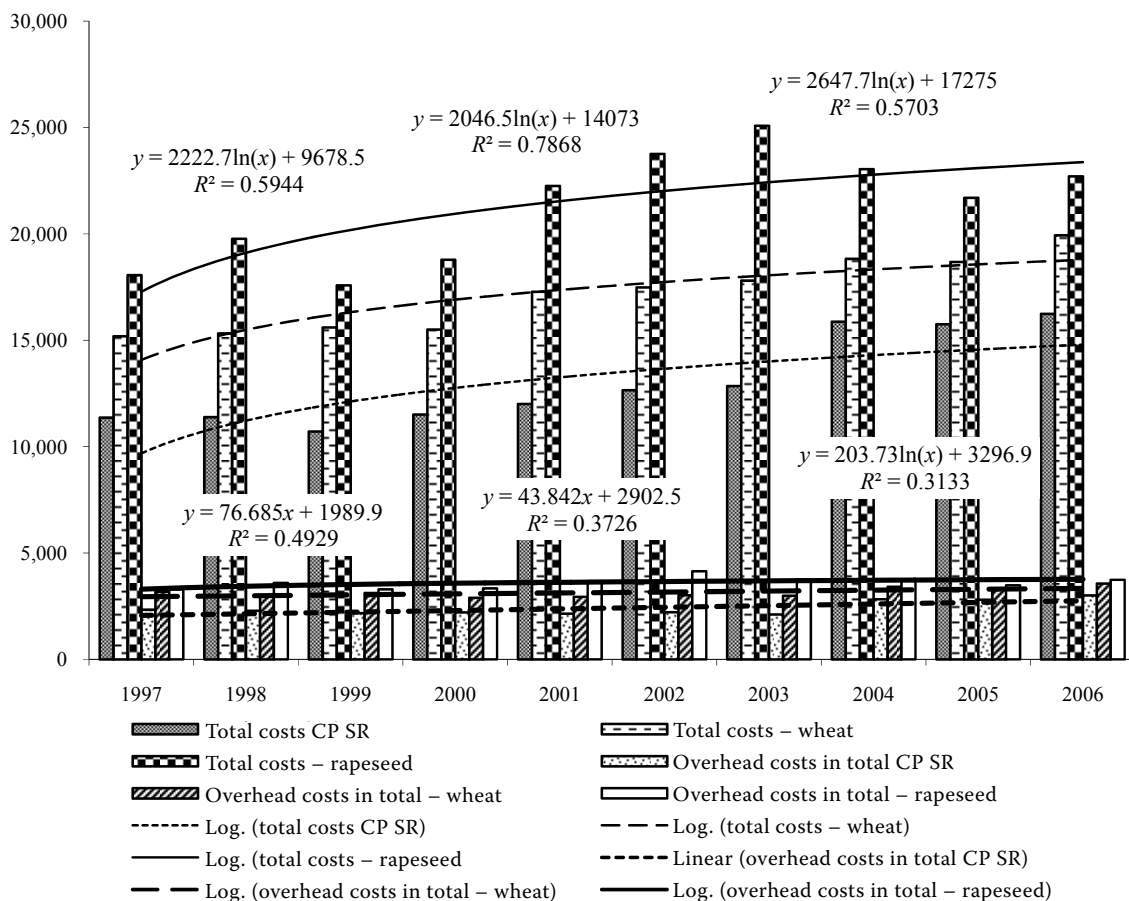


Figure 1. The development of direct and overhead cost in crop production in Slovakia within the years of 1997–2006 (SKK/ha of agricultural land)

Source: The Research Institute of Agricultural and Food Economics of the Slovak Republic; Costs and income of agricultural products in Slovakia, years 1997–2006; own calculations.

The variant calculation methods enable a multidimensional view on the product as well as the market. The sequence of their implementation should be the following:

- good handling of the classical calculation of total costs,
- determination of variable and fixed costs as well as compiling calculations of variable (incomplete) costs, distribution of fixed costs for fixed costs of the output, groups of outputs, centres and enterprise,
- drawing attention towards the processes and AB-techniques which are connected to them – regarding calculations with the ABC method,
- a gradual application of calculation methods for the strategic cost management (target costing and calculation of the life circle).

- comprehension of calculations as an instrument emanating merely from the date of financial accounting,
- the absence of using preliminary calculations for the deflection management,
- the lack of knowledge about calculation methods in the software solution – the person who knows the most about how to compile calculations is the IT-employee, although he/she is not motivated enough to maximise the reliability and the testifying ability of calculations,
- not realising the opportunity of calculation usage in order to determine the internal prices of the production for the needs of the responsibility management.

## CONCLUSION

In various Slovak enterprises, calculations are not appreciated sufficiently enough by the managers. The reasons might lie in:

In circumstances of asserting controlling, in modern information systems as well as in technologies, the usage of calculations in management is widespread. In order to be acquainted with them, managers can study scientific and academic publications as well as the appropriate internet portals. We recommend the portal [www.point-consulting.cz](http://www.point-consulting.cz), which can be utilised as a useful handbook when implementing and using

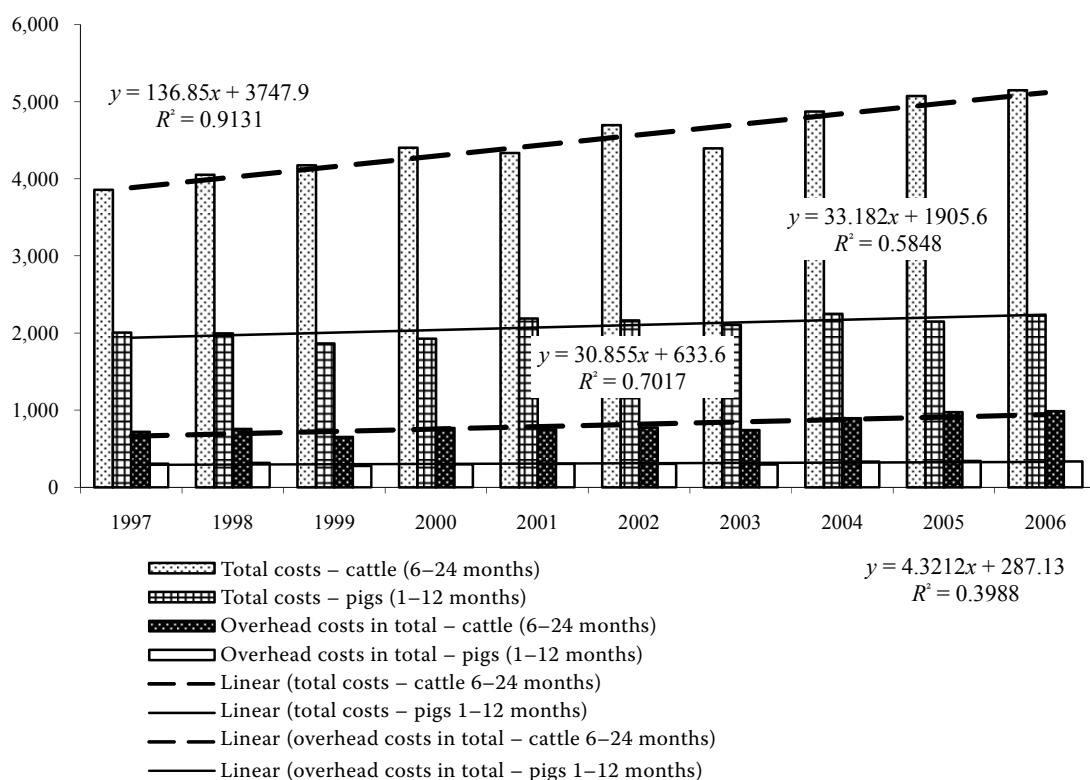


Figure 2. The development of direct and overhead cost in crop production in Slovakia within the years of 1997–2006 (SKK/ha of agricultural land)

Source: The Research Institute of Agricultural and Food Economics of the Slovak Republic; Costs and income of agricultural products in Slovakia, years 1997–2006; own calculations

the variant calculation system. Helpful information regarding information systems of companies (which also encompass the calculation system) can be gained on internet sites such as: [www.efocus.sk](http://www.efocus.sk) and [www.SystemOnLine.cz](http://www.SystemOnLine.cz).

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Arrived on 11<sup>th</sup> June 2008

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