

ANALYSIS OF SEASONALITY OF SALES AND OF DEMAND  
FOR SPARE PARTS FOR TRACTORS AND AGRICULTURAL  
MACHINERY IN POLAND ON THE EXAMPLE OF A SELECTED  
FIRM DEALING WITH THE DISTRIBUTION OF SPARE PARTS

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**Summary.** An analysis of seasonality and demand for spare parts for tractors and agricultural machinery was made. The demand for spare parts for agricultural machinery is correlated with the agrotechnological timing, although sales of spare parts takes place all year round. The biggest demand for replacement parts is for the older generation of URSUS tractors, which are widely used in Polish agriculture.

**Key words:** spare parts, sales, seasonal sales.

## INTRODUCTION

High operational availability of tractors and agricultural machinery is associated with the proper removal of defects, which is often associated with a rapid supply of spare parts needed in the necessary range and quantity. Factors such as delivery time of spare parts needed, complete supply of spare parts and time of the repair work, as suggests Masiuk in his research (1998) are of utmost importance in maintaining the operational readiness of technical measures. The fact that the efficient distribution of spare parts is important is proven by Pasyniuk's observations (2007), who states that most of the work on the operation of equipment repairs was associated with replacing components or entire sets (over 60% of observations). Efficient distribution requires an efficient logistics system [Juściński and Piekarski 2008, Slobodyanyuk and Nechaev 2010]. An important factor for an effective system of distribution of spare parts is to know the seasonality of demand and the structure of demand for spare parts.

## AIM

The aim of this study was to analyze the seasonality of sales and demand for spare parts for tractors and agricultural machines in Poland. The results were obtained on the basis of distribution

of spare parts for tractors and agricultural machines in the company of ROL-MAR involved in the supply of spare parts to customers throughout the country and the knowledge and professional experience of its employees.

### SEASONALITY OF SALES OF SPARE PARTS FOR TRACTORS AND AGRICULTURAL MACHINERY

Seasonality of field work depending on climatic conditions is also reflected in the seasonality of sales of spare parts. Based on the experience of ROL-MAR company general spare parts spread out over two seasons: the first season, depending on the year and the temperature increase above the "0" covers the months of February, March, April and May and the second season starts from late July and August and lasts until October when the amount of field work decreases. Seasonality and structure of sales of spare parts for 2007-2009 are shown in Figures 1-3. Due to limited public availability of the presented data, the charts show no values on the y-axis.

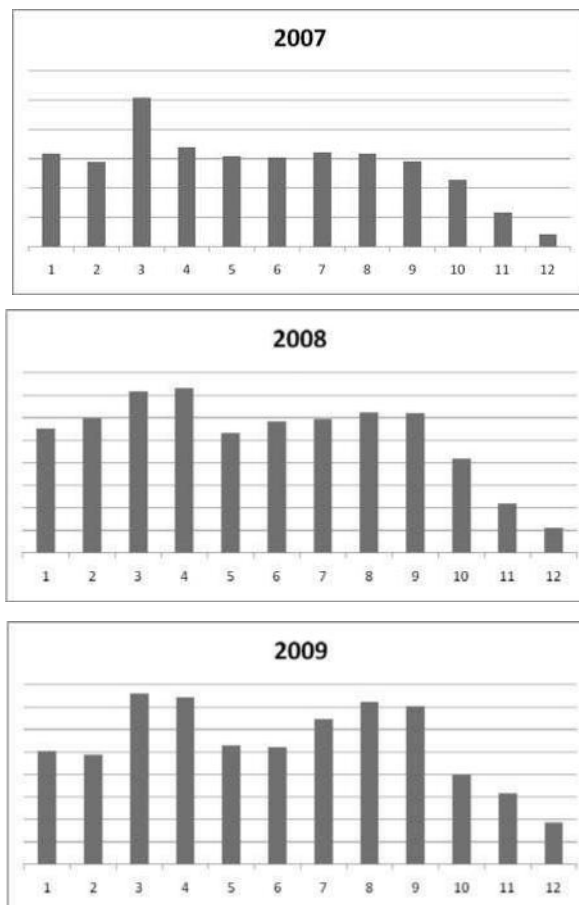


Figure 1 -3 Seasonality of sales of all parts for agricultural machinery  
Source: The authors' own calculations based on ROL-MAR

However, when analyzing cases of specific machines it can be concluded that the peak demand for spare parts is correlated with periods of work of specific agricultural machines, but sales of spare parts for these machines takes place practically the whole year. So, spare parts for such machinery, such as lawn mowers, although the actual time of mowing the grass is - depending on the weather- the period from May until August and sometimes later, they start to sell at the end of January or early February, because large stores want to buy in large quantities at low prices for goods before the season. This leads to a forward shift in the season compared to the actual needs of farmers in each subsequent lot of the sale. Therefore, the manufacturers of such components must begin production well in advance to the expected season of the actual work and machinery repair. A large number of manufacturers have focused on the parts for one type of machine in order to prevent the seasonality of work causing increased discounts in their companies during periods of reduced demand for products. Seasonality of sales of parts for lawnmowers is shown in Figure 4

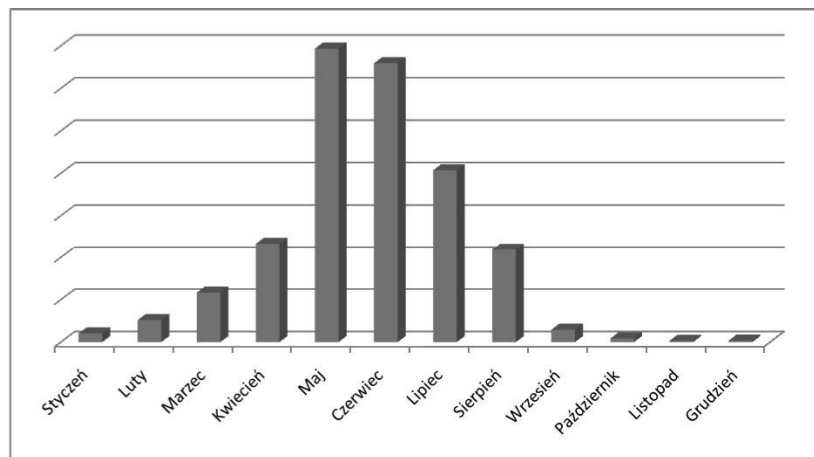


Fig.4 Seasonal sales of parts for rotary lawn mower  
Source: The authors' own calculations based on ROL-MAR

As the chart shows the maximum peak sales more or less coincides with the time of the work of the mower. However, its start is shifted forward by several months until January. As comes from the observation, such is the case with most groups of parts for agricultural machinery. The shift is even greater in the case of machines with a very complex structure and forced long term repairs such as combine harvesters like Bizon.

A similar phenomenon was observed by Juściński and Piekarski (2009), who examined the seasonality of demand for replacement parts for warranty repairs for John Deere tractors.

#### ANALYSIS OF THE DEMAND FOR SPARE PARTS FOR MACHINERY AND TRACTORS

In the market of spare parts, as in other types of sales, an increased demand for specific products is present for different reasons. The most frequently ordered spare parts for tractors and agricultural machines in the country are summarized in Table 1

Table 1. The most frequently ordered spare parts for tractors and agricultural machinery

Nr.	Index	Name
1	50671060	Driver's seat C-330/360
2	46650440	CENTRAL LINK C-360
3	46650110	HANGER P KOMPL. C-360
4	50613030	Radiator C-360
5	50671070	One-piece driver's seat C-330/360
6	46650390	SIDE CHAIN C-360
7	1410010010	Cultivator tooth Bagra
8	CPDOP150S525.04	Dispenser for motor C-360 HSL150/F2
9	42371110	HANGER P KOMPL. C-330
10	42293023	Radiator C-330
11	46650040	Lower link for tools C-360
12	42272213	Pivot switch 16 with nut C-330/360
13	46546310	Hydraulic pump (lift) C-360 HYLMET
14	THMC360	Repair kit THM C-360
15	5036010450/G	Rotation lawn mower knife (Polish) Gerlach
16	86450999	Upper link C-385 4-cyl.
17	50490030	Valve plug M22x1.5 COP50.072.490030
18	42370451	Central link C-330
19	46403991/OS	crankshaft C-360 (Ostróda)
20	69185771RI	Starter with reducer C-330/360/Zetor import
21	466570001	starter R-11a -Import C-330/360
22	9620010	switch WE11A C-330/360 Kwidzyń
23	46505110CH	Motor head with set of valves URSUS C-360
24	LRH3P	Operating rectangular lamp LRH3P
25	50833091K	BOLT SET flat axle -330/360

Source: The authors' own calculations based on ROL-MAR

As noted, there is a strong demand for items 1 and 5, that is the seat for Ursus C-330 and C-360 tractors and this is due to the relatively high age of the machines and the frequent damage to

the seats and their not very high resistance. Another group for which there is significant demand is part of the three-point suspension system (items, 2, 3, 6.9, 11, 16.18), which wear out quite quickly due to work under heavy load during the field work such as ploughing. They are also often cited because of the large number of poor-quality products that are on the market which is caused by a very big urge of farmers to low prices.

Studies have shown that there is always quite strong demand for the import of low quality but cheap parts and thus very frequent exchanges and forced purchases of new parts. Often cited elements are also spare parts for tractor engines, such as coolers and that due to their fragility and vulnerability to mechanical damage. Another reason is the presence of poor quality coolers on the market that can not withstand the high temperatures in summer and are overheating and leaking. Coolers occurring in the market have sometimes reduced amount of water channels, thus they are lighter, cheaper, but not appropriate for the machines in which they are used, and hence their high failure rate. Studies have shown that the most commonly sold spare parts account for about 20% in the ROL-MAR wholesale offer of quantitative structure and the proceeds from the sale of spare parts of this group can reach even 80% of aggregated revenues which confirms the 20/80 rule (Pareto principle) [Internet] in the company's business. As employees responsible for the distribution of ROL-MAR state, the remainder of the offer, however, is necessary because the sale of the remaining parts drives the sales of these top-selling products. If less popular equipment was not on offer which is the mentioned 80% of the sales structure this would reflect adversely on the distribution of spare parts, as most stores would be supplied elsewhere, where the offer is much broader.

## CONCLUSIONS

Studies confirm findings of other researchers that the sales volume of spare parts for tractors and agricultural machinery is seasonal and associated with the timing of agricultural practices performed. However, the overall sales do not show absolute correlation of volume of sales of spare parts with periods of field work performance. This is due to the fact that a number of retail buyers make pre-season purchase of spare parts by using the manufacturers' discounts. A significant share in the structure of demand belongs to the spare parts for the older generation of currently not produced URSUS tractors. This is due to the fact that these tractors are still widely used in the Polish agriculture and because of age are subject to frequent breakdowns.

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ANALIZA SEZONOWOŚCI SPRZEDAŻY I POPYTU CZĘŚCI ZAMIENNYCH  
DO CIĄGNIKÓW I MASZYN ROLNICZYCH W POLSCE  
NA PRZYKŁADZIE WYBRANYCH FIRM ZAJMUJĄCYCH SIĘ  
DYSTRYBUCJĄ CZĘŚCI ZAMIENNYCH

**Streszczenie.** Przeprowadzono analizę sezonowości i popytu na części zamienne do ciągników i maszyn rolniczych. Popyt na części zamienne do maszyn rolniczych jest skorelowany z sezonami zabiegów agrotechnicznych, mimo że sprzedaż części zamiennych odbywa się przez cały rok. Największy jest popyt na części zamienne dla starszej generacji ciągników URSUS, które są szeroko stosowane w polskim rolnictwie.

**Słowa kluczowe:** części zamienne, sprzedaż, sezonowa wyprzedaż.