

## ACCIDENTS DURING THE USE OF TRACTORS IN INDIVIDUAL FARMS

### Summary

The article presents an analysis of accidents when handling tractors in individual farms in West Pomeranian Province in the years 2009-2013. Data were compiled on the basis of information provided by the Agricultural Social Insurance Fund (KRUS) Regional Office in Koszalin. It was found that accidents caused by agricultural machinery and equipment occurs mostly during the use of tractors. The highest percentage of incidents represent falls caused by the wrong way of getting into the tractors and getting out of the tractors. As a result of accidents, most often farmers suffer injuries of the upper and lower extremities.

**Key words:** agricultural tractor, accidents in agriculture

## WYPADKI PODCZAS OBSŁUGI CIĄGNIKÓW ROLNICZYCH W GOSPODARSTWACH INDYWIDUALNYCH

### Streszczenie

W artykule przedstawiono analizę wypadków podczas obsługi ciągników rolniczych w gospodarstwach indywidualnych województwa zachodniopomorskiego w latach 2009-2013. Dane opracowano na podstawie informacji udostępnionych przez Oddział Regionalny KRUS w Koszalinie. Stwierdzono, że do wypadków z udziałem maszyn i urządzeń rolniczych dochodzi najczęściej podczas użytkowania ciągników rolniczych. Największy odsetek zdarzeń stanowią upadki powodowane niewłaściwym sposobem wsiadania i wysiadania z ciągników. Rolnicy wskutek wypadku najczęściej doznają urazów kończyn górnych i dolnych.

**Słowa kluczowe:** ciągnik rolniczy, wypadki w rolnictwie

### 1. Introduction

In agriculture, accidents at work occur more often than in other sectors of the economy. In addition to mining and construction, agriculture is one of the three most dangerous sectors of the economy. The diversity of activities carried out by farmers is associated with many hazards that can cause accidents. As a consequence, farmers suffer serious injuries resulting in temporary or long-term exclusion from active work. Many accidents caused by agricultural machinery result in fatal injury [5, 7, 8, 10, 11].

KRUS data show that in individual farms such events reach more than 20,000 each year (Fig. 1). The structure of

accidents in recent years is not significantly affected – most people have been injured as a result of "fall of persons", "grab or stroke by moving parts of machinery and equipment", and "beating, weighing down or biting by animals". Among the events involving agricultural machinery and equipment, the biggest percentage of accidents was during the use of tractors. Every year there are more than 1.5 thousand this type of event (Fig. 2) [1, 2, 3, 4].

The tractor is primary machine used during work on a farm. Used during field work with cooperating machines and transport works, undoubtedly it facilitates the work, increases productivity and can reduce its costs. It is also a threat to the health and life of farmers serving it.

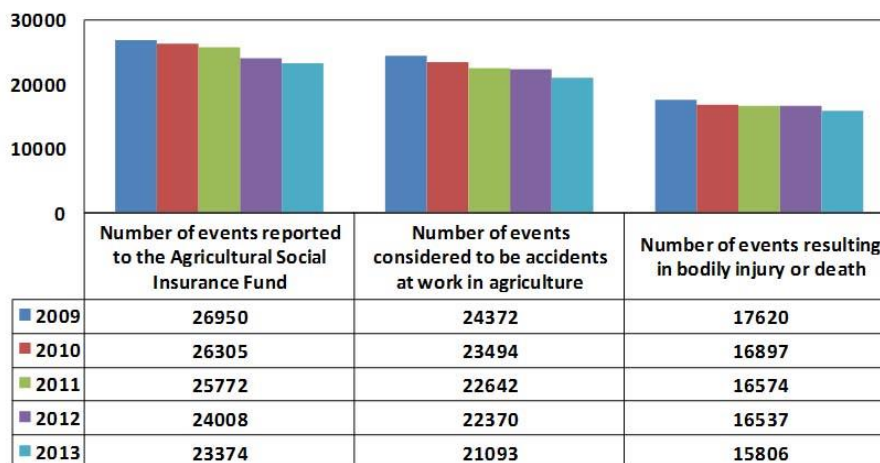
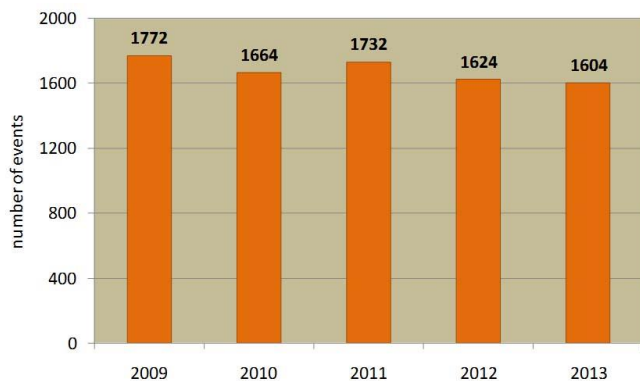


Fig. 1. Number of accidents among farmers in the years 2009-2013 [12]

Rys. 1. Liczba wypadków rolników w latach 2009-2013 [12]



Source: The study based on data from KRUS  
 Źródło: Opracowanie własne na podstawie danych KRUS

Fig. 2. Number of accidents caused by agricultural tractors in the years 2009-2013

Rys. 2. Liczba wypadków z udziałem ciągników rolniczych w latach 2009-2013

## 2. Materials and methods

The aim of the study was to analyse the causes and circumstances of accidents when operating tractors in Western Pomerania on the basis of data KRUS Regional Office in Koszalin, which were collected during accident investigations carried out in the years 2009-2013. During this period, it completed the proceedings and establish the cause of the accident in 1625 cases.

## 3. The results of the analysis

Nearly 50% of the events were falls of persons, 13.5% of the events took place when grabbed or being hit by moving parts of machines and devices, and falling objects occurred in 8.8% of cases (Table 1).

Tab. 1. Summary of accidents by causes in the years 2009-2013

Tab. 1. Zestawienie wypadków według przyczyny w latach 2009-2013

Groups of events	Number of cases	Percentage
Fall of persons	797	49,05
Fall of objects	143	8,8
Contact with sharp hand tools and other sharp objects	87	5,35
Hitting and overwhelming by the materials and objects transported mechanically or manually	17	1,05
Running over, hitting, grabbing by the means of transport in motion	29	1,78
Grab and stroke by moving parts of machines and equipment	220	13,54
Beating, weighing down or biting by animals	127	7,82
Fire, explosion, acts of nature	12	0,74
Extreme temperatures	26	1,6
Harmful substances	1	0,06
Sudden illness	42	2,59
Others	124	7,63

Source: The study based on data from KRUS  
 Źródło: Opracowanie własne na podstawie danych KRUS

The analysis shows that the largest group of accidents at work on the farm were events without the participation of machinery and equipment (940 recorded cases). The next group in terms of number of reported accidents were those of the tractors and trailers for transport, as shown in the Table 2.

Tab. 2. Statement of accidents per share type of machine in the years 2009-2013

Tab. 2. Zestawienie wypadków według udziału rodzaju maszyny w latach 2009-2013

Machine types	Number of cases	Percentage
Tractors	150	21,9
Grain drills	13	1,9
Potato planters	3	0,4
Circular saws	70	10,2
Chainsaws	39	5,7
Machines and equipment for preparing animal feed	10	1,5
Manure spreaders	4	0,6
Broadcast spreaders	2	0,3
Grain harvesters	36	5,3
Harvesters and other machines harvesting root crops	16	2,3
Cultivating machinery and equipment	21	3,1
Sprayers	13	1,9
Transport trailers and horse-drawn wagons	140	20,4
Machines harvesting hay, straw and green fodder	15	2,2
Storage devices and conveyors	10	1,5
Hand power tools	45	6,5
Other machinery and equipment	96	14,0
Cars, motorcycles, bicycles, etc.	2	0,3

Source: The study based on data from KRUS  
 Źródło: Opracowanie własne na podstawie danych KRUS

Most accidents during the use of agricultural tractors occurred during getting into and getting out of the vehicle. The falls in these situations were caused mainly by improper way of operation. Farmers jumped out of the cab or disembarked directed ahead to the environment not using assistant handles and ladders, whereby not all tractors were equipped. The risk of falling into this group of events increased the use of inappropriate or soiled footwear, causing slipping from the steps of the tractor. Successive groups of accidents when using tractors were falling objects and capture or hit by moving parts of machines. These occurred mainly during repairs and maintaining of tractors carried out by the farmers and combining with cooperating machines. The cause of these events was in many cases running drive and lack of necessary protective covers. The burns occurred mostly during harvesting as a result of improper handling or cooling system failure. The most dangerous for health and life were cases when run down by a farm tractor. Such situations occurred after starting the tractor from the outside, not turning off the drive and improper securing the vehicle when parked. In the majority, the risk of accidents was increased by hasty performing of activities. Statement of accidents involving tractors by event type is shown in the Table. 3.

Tab . 3. Summary of accidents caused by agricultural tractors by type of event in the years 2009-2013

Tab. 3. Zestawienie wypadków z udziałem ciągników rolniczych według rodzaju zdarzenia w latach 2009-2013

Types of events	Number
Falls during getting into/out of	82
Falls of objects	11
Grab and stroke by moving parts of machines and equipment	10
Burn	8
Running over	7
Others	32

Source: The study based on data from KRUS  
 Źródło: Opracowanie własne na podstawie danych KRUS

Accidents when operating tractors in nearly 50% of the cases resulted in injuries among farmers in the upper limbs and more than 30% of the injuries of the lower limbs. In other cases, head injuries and chest injuries and other multiple internal injuries caused by running over by a tractor were the consequence of the accident. Statement of accidents caused by agricultural tractors according to the location of the injury are shown in Table. 4.

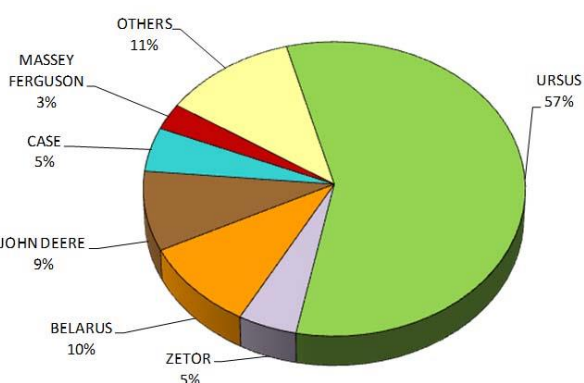
Tab . 4. Statement of accidents caused by agricultural tractors by positioning injury in the years 2009-2013

Tab. 4. Zestawienie wypadków z udziałem ciągników rolniczych według umiejscowienia urazu w latach 2009-2013

Places of injury	Number
Upper limbs	50
Lower limbs	70
Head	10
Chest	6
Multiple internal injuries	4
Spine	2
Others	8

Source: The study based on data from KRUS  
 Źródło: Opracowanie własne na podstawie danych KRUS

The analysis shows that the brand Ursus tractors accounted for the largest share in the structure of the accidents (Fig. 3). However, it is clear from the structure of Polish farms equipment, it is just most often used brand of tractor [6, 9].

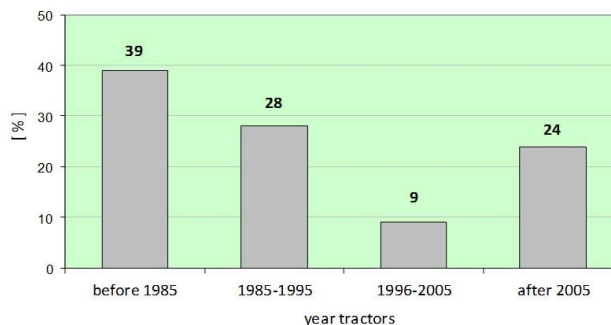


Source: The study based on data from KRUS  
 Źródło: Opracowanie własne na podstawie danych KRUS

Fig. 3. Percentage of tractor brands, which reported as involving the occurrence of an accident during 2009-2013

Rys. 3. Procentowy udział marek ciągników, z udziałem których odnotowano zaistnienie wypadku podczas pracy w latach 2009-2013

Farms, where the accident occurred when handling agricultural tractors, were equipped with tractors of different age structure. In the overwhelming number of farms there were used tractor manufactured before 1985, least of machines were produced in 1996-2005 (Fig. 4).



Source: The study based on data from KRUS  
 Źródło: Opracowanie własne na podstawie danych KRUS

Fig. 4. Tractors, with the participation of which there have been an accident at work in the years 2009-2013

Rys. 4. Rok produkcji ciągników, z udziałem których doszło do wypadku przy pracy w latach 2009-2013

#### 4. Conclusion

Based on the analysis of the causes and circumstances of the accidents the conclusion is that while operating farm machinery, the event of accidents occurred most frequently during the use of tractors. The largest proportion of incidents were caused by falls when getting into and getting out of the tractors, and the work done in a hurry increased the risk of their occurrence. When operating tractors, farmers frequently suffered injuries of upper and lower limbs. The most severe multiple internal injuries arose due to crossing a farm tractor. Misuse, lack of knowledge and skills of serving, non-compliance of safety and health at work make that the tractor may constitute a serious threat to the health and life of farmers.

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