TAPATURMA
VAKUUTUS
KESKUS

The number of fatal workplace accidents almost halved –

FATAL ACCIDENTS AT WORK IN 2009–2018

Finnish Workers' Compensation Center Analyses No 18E

11 April 2019

The number of fatal workplace accidents almost halved – Analysis of fatal accidents at work in 2009–2018

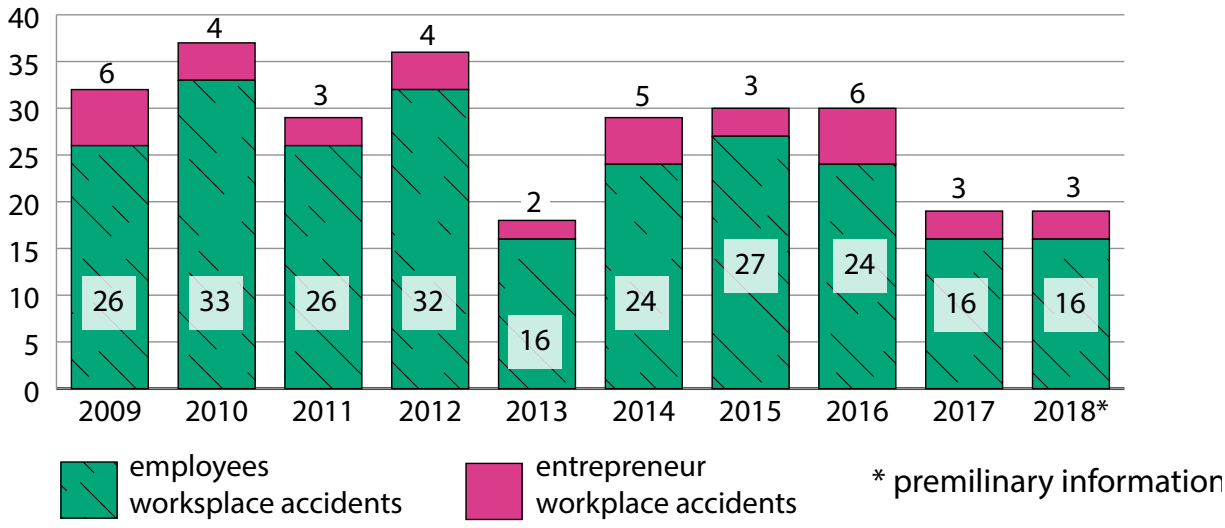
In 2009–2018, a total of 279 fatal workplace accidents occurred in Finland. A significant part of these took place in the transportation and storage, construction and manufacturing industries. This analysis looks at what kind of fatal workplace accidents have occurred over the last ten years and the direction in which they have developed.

BY OTTO VEIJOLA, THE FINNISH WORKERS' COMPENSATION CENTER

According to information received by TVK*, there were 19 fatal workplace accidents across 18 different incidents in Finland in 2018. Of these fatal workplace accidents, 16 happened to employees and three to entrepreneurs. All the deceased persons were men and two of them were foreign employees of a foreign company. In three cases, the deceased person was an agency worker.

The lowest number of fatal workplace accidents in recorded history is from 2013, when 16 employees and 2 entrepreneurs lost their lives in work-related accidents. However, the number of fatal accidents at work has been on a downward trend over the last ten years. Ten years ago, in 2009, when the number of fatal workplace accidents was the lowest recorded up to then, there were 32 fatal workplace accidents.

Diagram 1. Fatal accidents at work in Finland in 2009–2018. The diagram data is presented in Table Appendix 1A.



*The figures for 2018 are based on cases reported to TVK, not on the register of occupational accidents and diseases. The figures may still change.

When looking at the number of fatal workplace accidents, it should be noted that even a small change in the figures on an annual basis may appear significant as the number of cases is rather low. Fatal accidents at work are usually isolated cases, making it challenging to analyse trends and draw conclusions from them. The distribution of the cases in, for example, the subcontracting chain across many different industries and modes of injury also creates challenges for drawing clear conclusions.

MOST OF THE FATAL ACCIDENTS IN 2018 OCCURRED IN THE MANUFACTURING, CONSTRUCTION, TRANSPORTATION AND STORAGE INDUSTRIES

The highest number of fatal workplace accidents in 2018 occurred at companies operating mainly in the manufacturing industry (5 employees, 1 entrepreneur), the construction industry (5 employees, 1 entrepreneur) and the transportation and storage industry (4 employees, 1 entrepreneur). Compared to the previous year, the numbers of fatal workplace accidents involving employees changed as follows: manufacturing (+1 accident), construction (+3 accidents) and transportation and storage (-1). In addition to the above, fatal accidents at work also took place in the sectors for other service activities (1) and environmental maintenance (1) in 2018.

The majority of these fatal workplace accidents occurred on construction sites (5 accidents), mainly in the area for storage, loading and unloading (5), at the production facility, factory or workshop (5).

The persons who died in accidents at work were mainly employed in occupations related to installation or construction (6), as operators of machinery or vehicles (5) and in manufacturing or production (4).

279 FATAL ACCIDENTS AT WORK IN THE LAST TEN YEARS

A total of 279 fatal workplace accidents have occurred in Finland in 2009–2018. 239 employees and 40 entrepreneurs lost their lives in these accidents at work. Most of these occurred in the transportation and storage, construction and manufacturing industries (see Table 1).

About 65% of those who died were over 40 and about 92% (256) of them were men. The highest number of fatal accidents at work occurred in the age group 50–59 (91). 9.8% of the fatal accidents in this age group occurred in women.

Diagram 2. Fatal accidents at work in Finland in 2009–2018 by age group (pcs). Diagram data in table format in Appendix 1B.

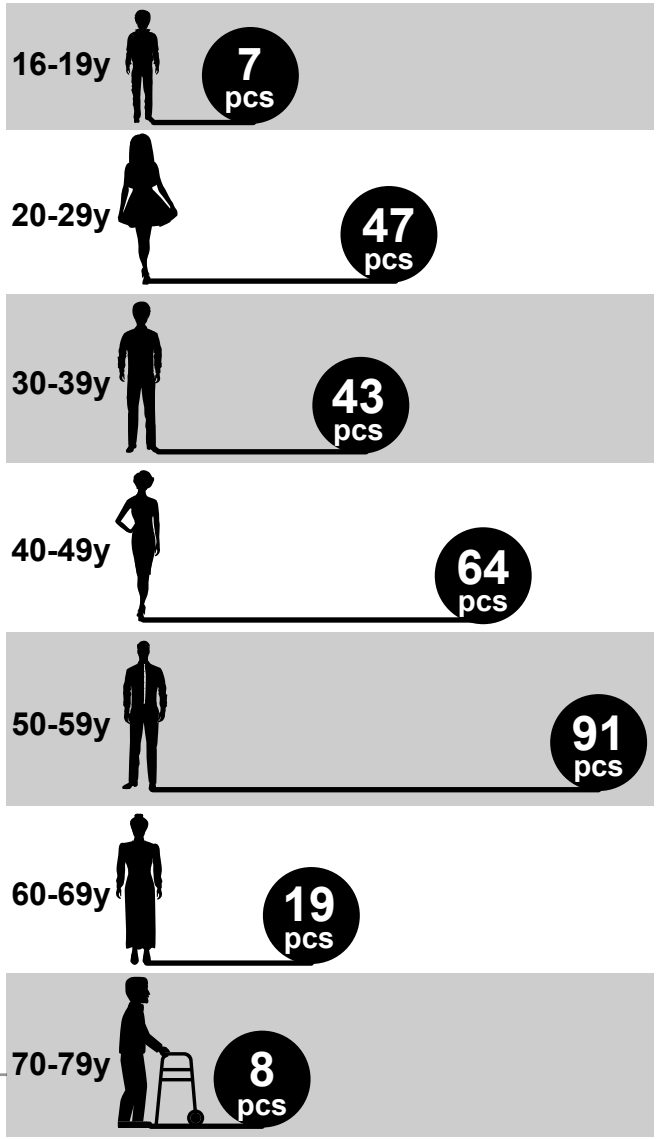


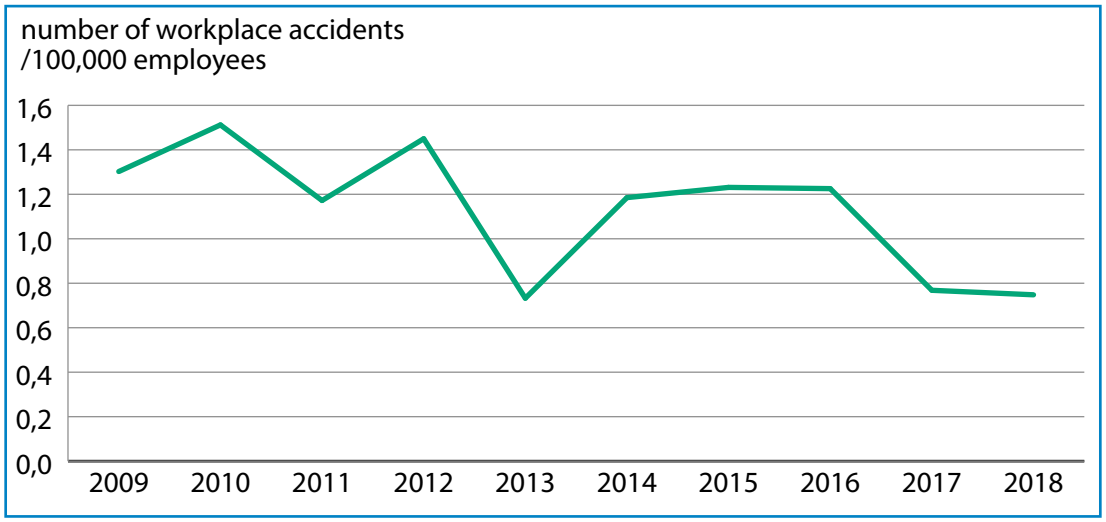
Table 1. Fatal accidents at work in 2009–2018 by branch of industry

Industry		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	TOTAL
A	Agriculture, forestry and fishing	3	2		1	1		1	2	1		11
B	Mining and quarrying	2					1		2			5
C	Manufacturing	1	8	1	5	4	4	3	4	4	6	40
D	Electricity, gas and heat supply, cooling	1	1		1							3
E	Water supply, drain and sewage disposal				1		1		1	2	1	6
F	Construction	8	7	4	9	4	9	3	9	2	6	61
G	Wholesale and retail trade	7	1	4	2	2	1	2		1		20
H	Transportation and storage	7	8	12	7	5	5	4	4	7	5	64
I	Accommodation and catering activities				1			4				5
J	Information and communications			2				1				3
M	Professional, scientific and technical activities		3	1	3	1	1		2			11
N	Administrative and support service activities	1	3	1	2		2	5	1	2		17
O	Public administration and national defence, excl. the municipal sector	2	3	2	1	1	2	3	4			18
P	Education							1				1
Q	Health and social services				1			2	1			4
R	Arts, entertainment and recreation			2			1					3
S	Other service activities				1		2				1	4
T	Households as employers							1				1
U	Activities of international organi-sations				1							1
(empty)			1									1
All in total		**32**	**37**	**29**	**36**	**18**	**29**	**30**	**30**	**19**	**19**	**279**

THE FREQUENCY OF FATAL ACCIDENTS AT WORK HAS FALLEN

Diagram 3 shows the accident incidence rate of fatal workplace accidents (incl. entrepreneurs), i.e. how many fatal workplace accidents have occurred in relation to the number of employees (100,000). In 2018, the number of employed persons was 3.4% higher than in 2009, but the ratio was lower by 0.55 units. This indicates that while the number of employed persons has increased, the number of fatal accidents at work has fallen in relation to the number of employees. In other words, the risk of a fatal workplace accident occurring has decreased significantly over the last ten years. The accuracy of the calculation is undermined by the fact that farmers and uninsured entrepreneurs are included in the number of employed persons even though their fatal workplace accidents are not included in this analysis. The numbers of employed persons have been drawn from the Labour Force Survey conducted by Statistics Finland.

Diagram 3. Accident incidence rate of fatal accidents at work in 2009–2018 (number of workplace accidents/100,000 employees). Diagram data in table format in Appendix 1C.

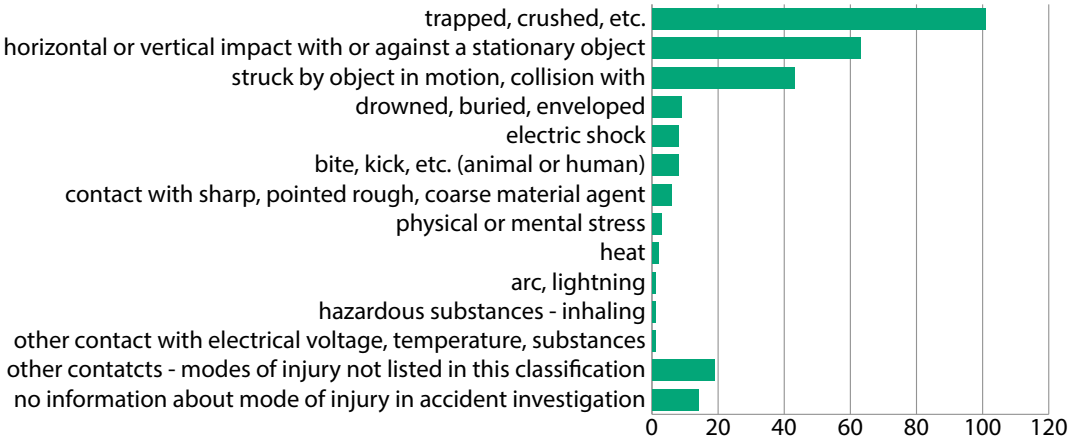


A significant portion (20.4%) of cases were due to slipping, stumbling and falling or fall of persons. The second highest number of fatal workplace accidents occurred as a result of breakage, bursting, splitting, slipping, fall or collapse of material agent (19.4%). In about 17% of cases, the deviation that preceded the injury was loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object or animal. Of these, only a few cases are estimated to have resulted from loss of control of an animal. The loss description included no information about the deviation in about 13.2% of recorded fatal accidents at work.

In the majority of cases (58.8%), the injury resulted from the victim being trapped or crushed, or from the victim's impact against an object. 15.4% suffered fatal injuries due to collision with an object in motion. In a significant portion of these, victims were run over by machinery, equipment and vehicles. The distribution of fatal accidents at work by region is shown in Figure 1.

Diagram 4. Fatal workplace accidents in 2009–2018 by deviation (deviation refers to the most recent abnormal event preceding injury). Diagram data presented in Table Appendix 1D.

Diagram 5. Fatal workplace accidents in 2009–2018 by mode of injury.
The diagram data is presented in Table Appendix 1E.



Below are a few brief accident descriptions of these fatal accidents at work:

"Received an electric shock from a pylon from a 20,000 volt high voltage line"

"Was killed in an in-store shooting incident"

"Was dropping off wood chips from the back of a lorry when fell into the unloading pit and ended up in the chip machine"

"Fell from a horse's back and hit head on the ground"

"Fell from a height of four metres onto concrete floor"

"Was trapped between a stack of planks and the wall"

"Fell from a height of about 4 metres from an aluminium ladder onto asphalt"

"Bent down onto the rollers when changing the roll of paper. Was trapped between the roll and the rollers"

"A boulder loosened and fell from the ceiling of the tunnel when wrenching it with an iron bar"

"Excavation accident, collapse of earth onto the employee"

"Lorry swerved into a ditch and flipped onto its roof"

Figure 1. Fatal workplace accidents 2009–2018 by region. The figure data is presented in Table Appendix 1F.

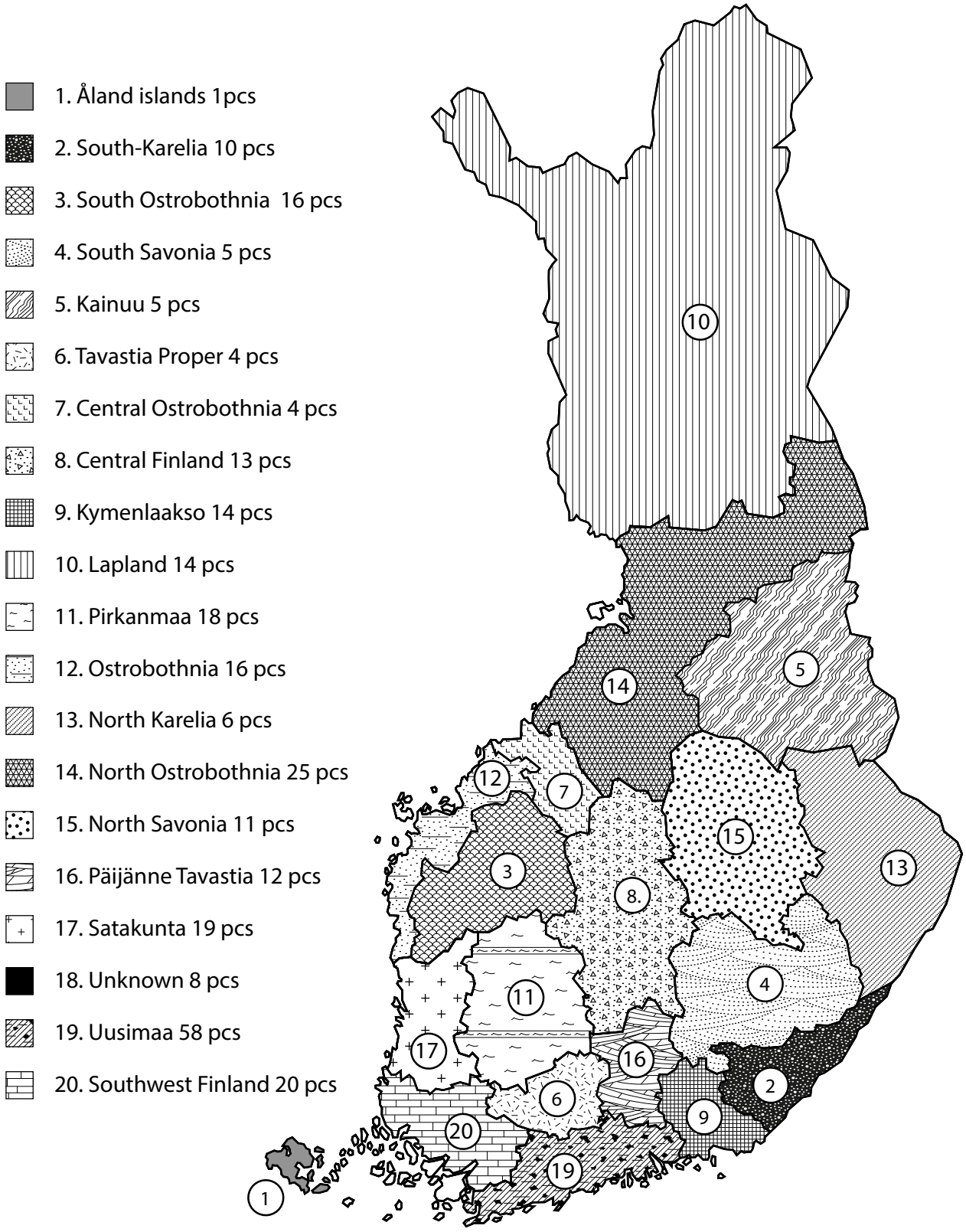
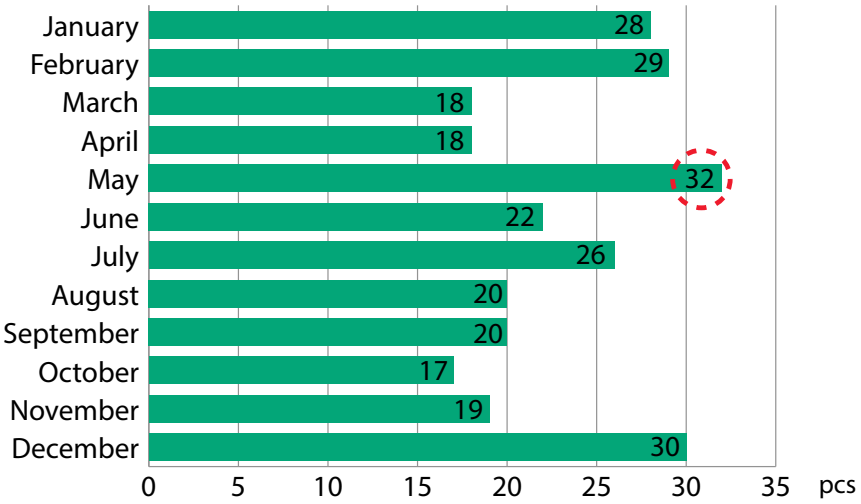
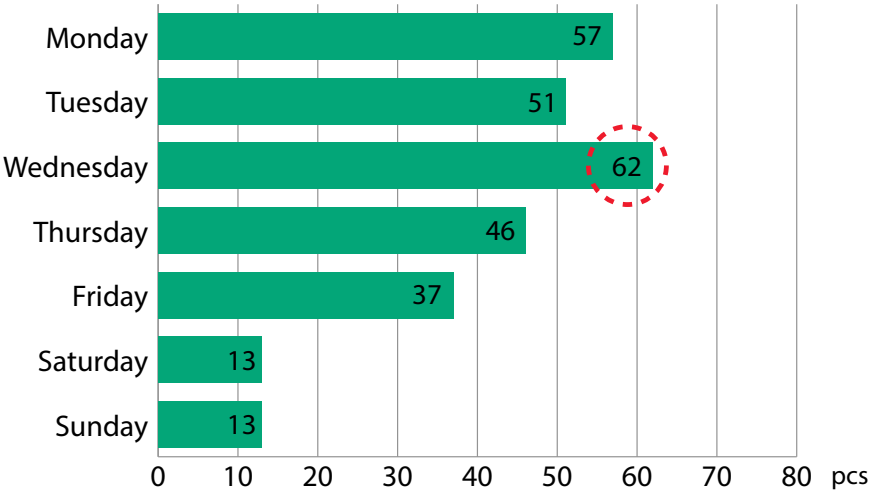


Diagram 6. Number of fatal accidents at work 2009–2018 by month. The diagram data is presented in Table Appendix 1G.



"During the last ten years, fatal accidents at work were most likely to occur in May and on a Wednesday"

Diagram 7. Number of fatal accidents at work 2009–2018 by day of the week. The diagram data is presented in Table Appendix 1H.



DATA USED IN THE ANALYSIS

The data for 2009–2017 is based on TVK's register of occupational accidents and diseases and the data for 2018 on cases reported to TVK. Consequently, the figures for 2018 are still subject to change and should be regarded as an estimate. For example, a serious occupational accident in which a person dies only later from the injuries resulting from the accident does not immediately come to our attention as a fatal accident at work. Therefore, the figures for 2018 are not fully comparable with those of previous years.

For entrepreneurs, the figures for 2009–2017 only include the workplace accidents of those with voluntary workers' compensation insurance.

TVK'S ACCIDENT INVESTIGATION HAS INVESTIGATED FATAL WORKPLACE ACCIDENTS IN 2018

TVK investigates accidents at work and produces anonymous publications about them to promote occupational safety. The aim is to learn and disseminate information by investigating accident cases to avoid similar accidents in the future. From the point of view of the development of occupational safety, it is of paramount importance that information on workplace accidents is reported publicly. In this way, the information obtained through investigation is passed on and is more readily available.

TVK carries out accident investigation as detailed investigation of accidents at work, or so-called TOT investigation, and in the form of shorter accident reports on the työpaikkakuolemat.fi website.

A TOT investigation has been launched on the following fatal workplace accidents or themes in 2018:

TOT 1/18 Two installers fell from the lift cage of a service lift during its erection phase

TOT 2/18 Internal transport fatal workplace accidents (themed investigation)

TOT 3/18 Cleaner became entangled in the production line at a food factory

TOT 4/18 Employee was trapped between the moving parts of a saw unit

Illustrative accident reports on the following workplace accidents in 2018 have been published on the työpaikkakuolemat.fi website:

Report 2/2018 Helper was trapped under a pile

Report 3/2018 Driver died while servicing a machine

Report 4/2018 Employee was crushed under a silo

Report 5/2018 Construction helper was run over by an excavator

Report 6/2018 Maintenance man was trapped under a small machine

Report 1/2019 Forklift collided with an installer

All the reports are freely readable and available. Unfortunately most reports are only available in Finnish.

Further information: Otto Veijola,
the Finnish Workers' Compensation Center (TVK),
otto.veijola@tvk.fi

The opinions expressed in this analysis report are those of the authors.

The analysis was concluded in April 2019.

TABLE APPENDIX 1

Table A. Fatal accidents at work in Finland in 2009–2018. Data for 2018 (*) is preliminary.

	employees' workplace accidents (pcs)	entrepreneurs' workplace accidents (pcs)
2009	26	6
2010	33	4
2011	26	3
2012	32	4
2013	16	2
2014	24	5
2015	27	3
2016	24	6
2017	16	3
2018*	16	3

Table B. Fatal accidents at work in Finland in 2009–2018 by age group.

Age groups	pcs
16–19	7 pcs
20–29	47 pcs
30–39	43 pcs
40–49	64 pcs
50–59	91 pcs
60–69	19 pcs
70–79	8 pcs

Table C. Accident incidence rate of fatal accidents at work in 2009–2018 (number of workplace accidents/100,000 employees)

	Number of fatal workplace accidents/100,000 employees
2009	1.30
2010	1.51
2011	1.17
2012	1.45
2013	0.73
2014	1.19
2015	1.23
2016	1.23
2017	0.77
2018*	0.75

Table D. Fatal workplace accidents in 2009–2018 by deviation (deviation refers to the most recent abnormal event preceding injury)

	Quantity/ deviation (pcs)
slipping, stumbling and falling, fall of persons	57
breakage, bursting, splitting, slipping, fall, collapse of material agent	54
loss of control (total or partial) of machine, means of transport or handling equipment, hand-held tool, object, animal	48
shock, fright, violence, aggression, threat, presence	19
deviation due to electrical problems, explosion, fire	9
body movement without any physical stress	7
body movement under or with physical stress	4
deviation by overflow, overturn, leak, flow, vaporisation, emission	3
other deviations not listed in this classification	41
no information about deviation in accident investigation	37

Table E. Fatal workplace accidents in 2009–2018 by mode of injury.

	Quantity/ deviation (pcs)
trapped, crushed, etc.	101
horizontal or vertical impact with or against a stationary object	63
struck by object in motion, collision with	43
drowned, buried, enveloped	9
electric shock	8
bite, kick, etc. (animal or human)	8
contact with sharp, pointed, rough, coarse material agent	6
physical or mental stress	3
heat	2
arc, lightning	1
hazardous substances – inhaling	1
other contact with electrical voltage, temperature, substances	1
other contacts – modes of injury not listed in this classification	19
no information about mode of injury in accident investigation	14

Table F. Fatal workplace accidents 2009–2018 by region.

	Quantity/ deviation (pcs)
ÅLAND ISLANDS	1
SOUTH KARELIA	10
SOUTH OSTROBOTHNIA	16
SOUTH SAVONIA	5
KAINUU	5
TAVASTIA PROPER	4
CENTRAL OSTROBOTHNIA	4
CENTRAL FINLAND	13
KYMENLAAKSO	14
LAPLAND	14
PIRKANMAA	18
OSTROBOTHNIA	16
NORTH KARELIA	6
NORTH OSTROBOTHNIA	25
NORTH SAVONIA	11
PÄIJÄNNE TAVASTIA	12
SATAKUNTA	19
UNKNOWN	8
UUSIMAA	58
SOUTHWEST FINLAND	20
All in total	**279**

Table G. Number of fatal accidents at work 2009–2018 by month.

Months	pcs
JANUARY	28
FEBRUARY	29
MARCH	18
APRIL	18
MAY	32
JUNE	22
JULY	26
AUGUST	20
SEPTEMBER	20
OCTOBER	17
NOVEMBER	19
DECEMBER	30

Table H. Number of fatal accidents at work 2009–2018 by day of the week.

Days of the week	pcs
MONDAY	57
TUESDAY	51
WEDNESDAY	62
THURSDAY	46
FRIDAY	37
SATURDAY	13
SUNDAY	13

The Finnish Workers' Compensation Center (TVK), Itämerenkatu 11–13, FI-00180 Helsinki