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TRENDS IN INVESTIGATING FATAL ACCIDENTS AT WORK IN THE 2010S

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TRENDS IN INVESTIGATING FATAL ACCIDENTS AT WORK IN THE 2010S

This analysis provides an overview of the fatal accidents at work that took place between 2010 and 2013 and were referred to a TOT investigation. The analysis presents a summary of the accidents referred to a TOT investigation and compares the quality and quantity of the investigated cases with the occupational accident register maintained by the Workers' Compensation Center. What kind of factors were identified in the TOT cases and do they follow the trends observed in the accident statistics?

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Accidents at work have been investigated by the Federation of Accident Insurance Institutions, and later by the Finnish Workers' Compensation Centre, since 1971. Initially, the process was called "the investigation of occupational accidents of catastrophic nature". The decision to investigate an accident was based on a case-by-case consideration, until in 1985 the first pilot began in which fatalities caused by accidents at work were investigated systematically. An acronym "TOT" is used of this process which is basically an abbreviation of the Investigation of the fatal workplace accident in Finnish. Following the positive lessons learned, the insurance sector and the labour market organisations agreed 30 years ago, on 7 May 1986, to set up a permanent TOT process.

During the period under review (2010–2013), the criteria for launching a TOT investigation have changed a great deal. Instead of all workplace fatalities being investigated, only cases that meet the criteria of providing new significant safety data on are processed. The TOT investigation method has also changed. First major changes were effected in 2010 when the participants in the TOT operations and the organisations using the TOT reports were surveyed about the process development needs. These were largely related to the analytical and systematic nature of the investigation and the substance of the proposed prevention measures. The development of a new investigation method began in 2011, and the first TOT report in compliance with the new model was published in 2014.

A wide range of accidents was investigated between 2010 and 2013. The working environment, the working processes and the risk level of the job may be very different depending on the sector. The objective of this analysis is to provide an overview of the TOT cases investigated in the 2010s and a cross section of the types of fatal accidents taking place at work today.

According to the data in the occupational accident register, 107 employees lost their lives in 2010–2013 as a result of 101 separate accidents at work. During the same period, 13 self-employed persons who had taken a voluntary insurance died in accidents at work. The TOT investigation was launched in 53 of these cases. Of these, 17 were referred to an extensive thematic study and 36 to an individual accident investigation. Of the individual investigations, 6 involved a fatal accident at

work which occurred in 2010 and where the victim was a self-employed person. The TOT investigation system was extended in 1998 when occasionally reports were published in the YTOT series on fatal accidents occurring to self-employed persons and other victims, who had been excluded from the scope of the original TOT agreement.

LARGE PERCENTAGE OF THE LAUNCHED TOT INVESTIGATIONS INVOLVED HIGH-RISK SECTORS

Over the period under review, the majority of the launched investigations
(roughly 74 %) took place in high-risk sectors (manufacturing, construction and transportation) (Table 1). Of the accidents at work in manufacturing, 18 were investigated. Of the manufacturing sectors, the highest number of investigations was launched in the manufacture of basic metals and manufacture of metal products. In manufacturing, fatal accidents at work most often took place in production facilities in working processes involving manufacture, refinement or processing. Typically, the injury resulted from a fall, a heavy object that trapped the victim, or the victim's impact against the object.

Table 1.
Number of fatalities referred to TOT investigation between 2010 and 2013 by the method of investigation and sector, number of fatalities caused by workplace accidents entered into the accident register, and number of TOT investigations. Table only includes sectors in which TOT investigations were ongoing in 2010–2013.

Sector	TOT	YTOT	Theme	No of investigations	Accident register
Manufacturing	14		4	18	18
Construction	8	5	5	14	21
Transportation	3	1	6	9	25
Property services, cleaning and environmental maintenance	1		3	4	6
Trade; wholesale and retail	2		2	3	8
Electricity, gas and water supply	1		2	3	3
Mining and quarrying	1		1	2	0
Agriculture, forestry, hunting and fishing	1		1	2	4
Public sector	1			1	6
Total	33	6	24	55	91

In construction, 14 investigations were launched, evenly distributed among the subfields in construction. Accidents that occurred in mining and quarrying have been recorded in the accident register statistics under construction because they took place during a tunnel excavation on a civil engineering site. Typically, the victim of a fatal accident worked at a building construction site and was involved in repair or maintenance work. Typically, the injury occurred when the victim fell on a hard surface. The Workers' Compensation Center's analysis series includes an overview of occupational safety in construction (Analysis no 4), published in June 2016, which provides further information on the changes and the accidents at work occurred in the sector.

In the transportation sector, 9 investigations were launched, 5 of which were extensive thematic studies. A total of 12 fatalities were investigated. Typically, the accident occurred in an area designated for storage, loading and unloading. The working process often involved maintenance, repairs, transport or transfers. Typically, the injury resulted from the victim being trapped or crushed, or from the victim's impact against an object. In transportation, traffic accidents have been referred to three extensive thematic studies concluded this year (TOT 4/14, TOT 5/14 and TOT 1/15).

Of all 53 TOT investigations launched in 2010–2013, the majority occurred in a production facility, factory or workshop. A significant share of the accidents also took place in areas designated for

storage, loading and unloading and on constructions sites (Diagram 2). Of the investigated accidents, roughly half occurred in a shared workplace and more than half in a temporary or occasional workstation.

Diagram 1.
Working environment distribution of the fatal accidents referred to TOT investigations launched in 2010–2013.

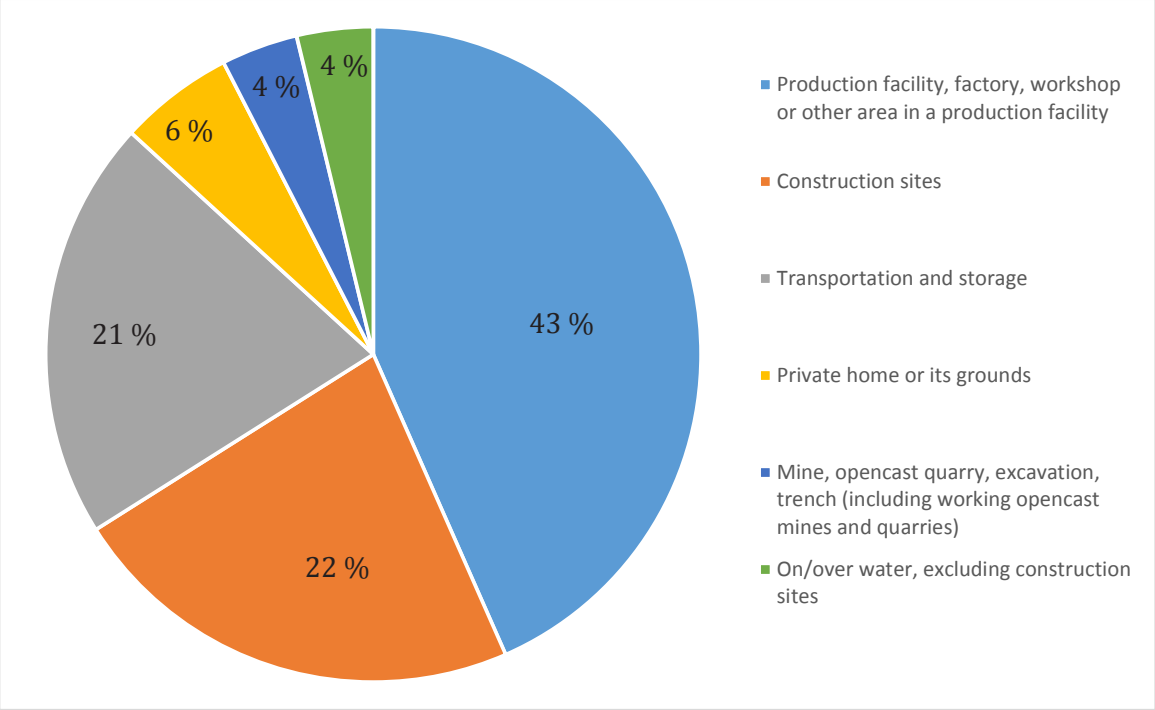
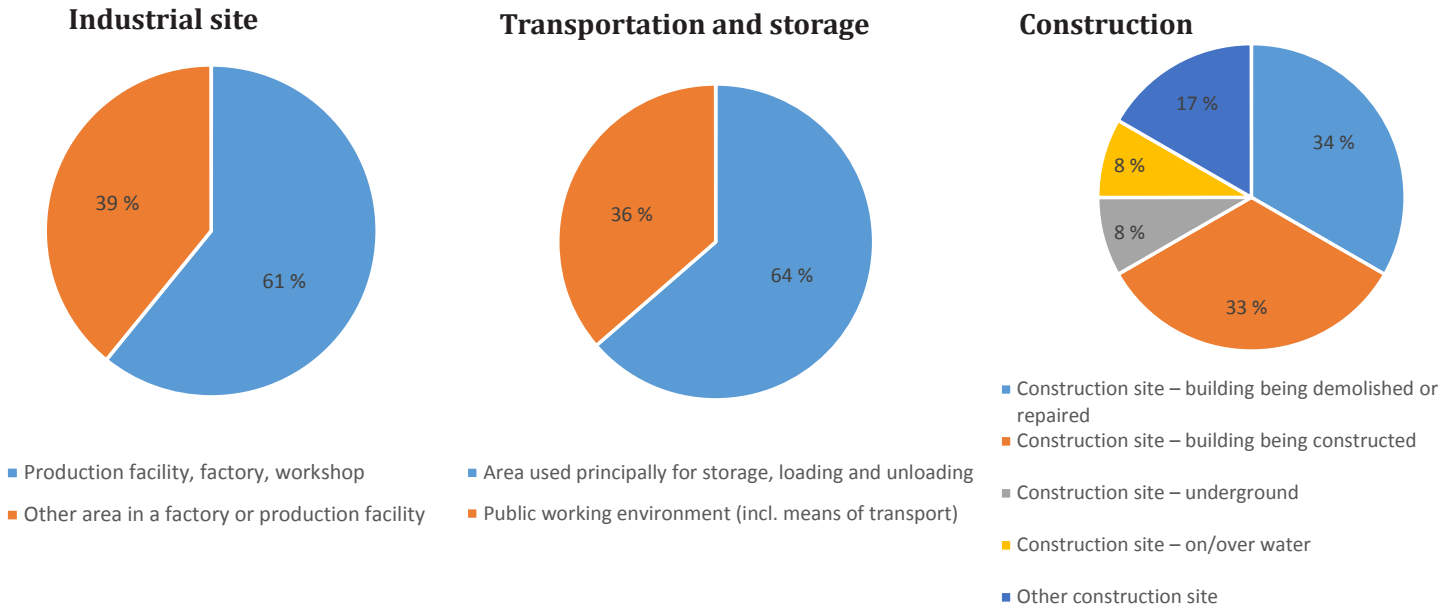
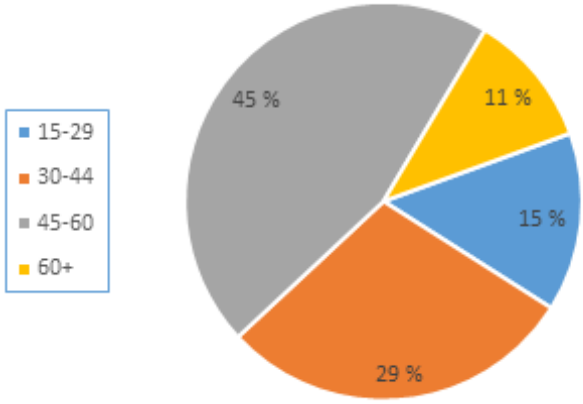


Diagram 2.
More specific definition of the working environment distribution on construction sites, manufacturing, transportation and storage for the fatalities referred to TOT investigations launched in 2010–2013.



The age range of the victims of the investigated accidents was 15–78 years. Victims aged 35–50 were heavily weighted in the age distribution. A similar trend can be observed in the occupational accident register.

Diagram 3.
Age distribution of persons who died as a result of accidents in 2010–2013 based on the launched TOT investigations.



TYPICAL FATAL ACCIDENT REFERRED TO TOT INVESTIGATION

A typical victim of a fatal accident that took place at work in 2010–2013 is a middle-aged man who is experienced or highly experienced in his occupation. The victim has been working in the same job for a long time in the same sector and received some kind of safety training and introduction for the working environment and his working processes. In a typical case, at the time of the accident the victim was working alone in an occasional or temporary workstation.

The specific physical activity which the victim was performing just before the accident often involved operating a machine or working with hand-held tools. The victim had used the safety devices required by the activity either insufficiently or not at all, and often acted in violation of the work plan and instructions. This is particularly common in working processes related to construction and maintenance, which have a systematic work plan. Several investigations established that the victim had independently decided to apply a working method in violation of the work plan because of overconfidence in his skills and experience. Work was often performed routinely, without sufficient attention to instructions, which resulted in unsafe practices. The most common modes of injury were the victim being trapped, crushed, struck by a falling object or falling himself.

Table 2.
Samples of TOT investigations launched in 2010–2013.

TOT 3/13	Metal worker (moulder) was trapped by a fallen flask
TOT 11/12	Fatal accidents at work occurring during person hoisting (thematic study)
TOT 6/12	Trailer reversed in an angle fell on the cabin of the drawing vehicle
TOT 11/11	Paper product machine operator was trapped between the reel of board and the rollers
TOT 21/10	Employee cleaning the tracks was struck by a train
TOT 18/10	Truck driver was trapped under a bundle of timber on a construction site

ACCIDENT-CAUSING FACTORS

Each investigated accident at work is different and caused by several factors. It is difficult to highlight any common factors among the most significant reasons behind the investigated accidents, mainly because the incidents have taken place in a range of sectors and working environments and therefore differ from each other a great deal.

There was rarely a single accident-causing factor; instead, the accident usually occurred as a sum of several factors and by their simultaneous impact. Based on the reviewed reports, it can be concluded that the contributing factors were typically caused by deviations in the working environment and the combined effect of dangerous or incorrect actions taken by the persons involved. Often the victim of a fatal accident had applied a dangerous working method and acted in violation of the safety instructions. In several cases, the victim did not act in violation of the instructions for the first time but had been using the dangerous working method for several years, so that it became an established method. A clear link was also observed between the use of dangerous working methods and the victim's inexperience. Although only few accidents involved an inexperienced worker, it has been established that in these cases inexperience played a major role. For example, sudden deviations in the working environment and the use of a dangerous working method were not identified. Acting in violation of the instructions was, in some cases, caused by the generally negligent attitudes shown at the workplace towards occupational safety.

SAFETY LEADERSHIP AND SUPERVISION

The investigation reports indicate that the most common deficiencies in safety leadership are associated with the identification and assessment of dangers, planning of work, instruction and supervision. In several cases, while the dangers had been identified and assessed for the common processes, this mapping was insufficient for situations that deviated from the normal. Working methods that were used in deviations had therefore not been assessed properly and the instructions given had been insufficient. In certain cases, where the dangers had been systematically identified and assessed, insufficiencies were found in communication. The worker performing the process had not been given appropriate information about the risks involved and his understanding of the risks had not been ensured.

Workers should always be involved in assessing the dangers associated with their work. They are also entitled to receiving assessment-based instruction and guidance in order to avoid harm and dangers that would threaten their health or safety.
Deficiencies were found in the instructions, maintenance and periodic inspections concerning machines and equipment. Matters related to equipment maintenance and instruction given about the working methods were particularly highlighted.

It is possible that working methods are slowly adapted, unnoticed by individual or the workplace community and as a consequence of quiet approval, and turned to methods that involve additional risks. Systematic workplace supervision is therefore essential, for the dangers associated with such customary and possibly hazardous methods to be identified. Appropriate supervision ensures that the methods applied in practice comply with the instructions.
In most cases, the victim had been working alone. Working on one's own always entails risk when working methods based on safe behaviours are used to control major hazards affecting occupational safety. Safe actions should be ensured using pair work or other solutions which enable help being given quickly in case of an accident.

HOW TO USE THE TOT REPORTS

TOT investigations have been conducted over 30 years for accidents at work that have resulted in more than 1,000 fatalities. The TOT reports on these cases are available for those involved in improving occupational safety. In designing process phases and working methods, it makes sense to check whether the investigated TOT cases concern similar processes. The investigation reports provide further information, and they can be used to map the risks identified during the planning stage. When employees are given examples of actual accidents that have taken place, they will take safety more seriously and commit to it better.

Each of the fatal accidents at work subjected to a TOT investigation can teach something new about occupational safety.

You can read the TOT reports at http://totti.tvk.fi.

Further information:
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The opinions expressed in this analysis are those of the author and based on the general information, causes and prevention measures presented in the published TOT reports.

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