

# TUKES REVIEW

2/2001

NEWS FROM THE SAFETY TECHNOLOGY AUTHORITY OF FINLAND

## Survey research - a route towards objectives



The main aim of TUKES is to have a society in which its fields of expertise and responsibility enjoy advance, assured conditions of technical safety and secure reliability and in which accidents do not occur. The achievement of this formidable objective requires continuous operational development based on researched and sufficiently penetrative data. It is through the results of its hard-gained data that TUKES can best define goals and respond to the questions "what", "why" and "when".

The driving force behind development can be said to be a combination of genuine curiosity, critical judgement and positive suspicion that leaves no possibility or place for unwarranted self-satisfaction. These factors are the drivers that bring new knowledge to the fore.

TUKES has defined its prime strategic survey research and development principals. They emphasise the keen monitoring of development, the introduction of new information together

with establishing foundations for the development of legislation. Also, for its own operational development, the refining and clarification of the data TUKES has itself acquired.

As a constituent part of society's safety system, TUKES is a supervising safety authority, not a research establishment. But, it is a fact though, that through undertaking survey research, participating in projects and studying our own valuable data, we have been able to chart the direction of our operations and establish objectives. It is clearly apparent that both in the present and future it is very important to bring about joint safety research projects between different parties and to also define the common shared aims identified through the information gained.

*Seppo Tuominen*  
Director General

TUKES REVIEW, published by Safety Technology Authority (TUKES), brings you current information about technical safety and reliability in Finland.

Founded in 1995, TUKES is a streamlined expert organisation and surveillance authority subject to the Ministry of Trade and Industry. We operate within the realms of process safety, pressure equipment safety, electrical safety, rescue service equipment, legal metrology, articles of precious metals, and CE-marked construction products.

On the Internet, you will find us at <http://www.tukes.fi>.

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# Accidents and near-misses in 2000

Of the accidents occurred last year within the sphere of our authority, 247 cases were duly reported to us. Cases in which nobody was hurt and which caused only minor costs – but involved a possibility of a serious accident – were classified as being near-misses. The accidents and near-misses by scene are shown in Figure 1.

Of the accidents registered by TUKES, 92 occurred in industry. Home and surroundings

and other outdoor areas accounted for 112 cases, the amount being strongly affected by 63 fireworks accidents. Public premises saw 25 accidents and near-misses, other scenes 18. In mines there were 2 accidents.

The accidents and near-misses happened in TUKES' field of operation in 1996–2000 are shown in Table 1. The data are based on the latest update of the VARO Accident Database.

A total of 11 persons died in the accidents in 2000, and 138 were injured. The number of fatalities was exceptionally high compared to the previous years. As much fatalities were seen last time eight years ago. Of those accidents, 5 involved electricity, 3 industrial handling of chemicals, 1 use of LPG at home, 1 elevators, and 1 explosives (Table 2).

Table 2. Fatalities and injuries and total number of cases in 2000 by accident category.

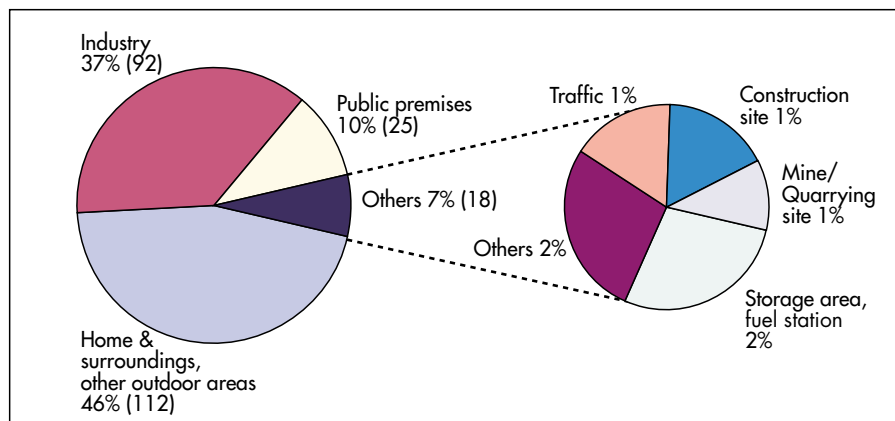


Fig. 1. Reported accidents and near-misses in 2000 by scene.

Table 1. Reported accidents and near-misses in 1996–2000. Any pressure equipment case involving chemicals is listed in the dangerous chemicals (6 cases in 2000) or in the LPG (1 case) category.

Accident category	Number				
	1996	1997	1998	1999	2000
Electrical equipment & installations	53	45	69	45	54
LPG	12	7	8	18	11
Dangerous chemicals	57	68	76	59	80
Elevators	8	22	14	13	12
Transportable gas containers <sup>1</sup>	3	3	3	6	4
Pressure equipment	13	17	10	16	14
Aerosol dispensers	1	2	7	9	1
Explosives	1	2	5	5	3
Use of fireworks, self-made bombs and explosives <sup>2</sup>	4	97 <sup>3</sup>	13	17	63
Natural gas	1	3	6	3	1
Transport of dangerous goods <sup>1</sup>	4	7	18	11	2
Mines	1		2		2
Others	3	4			
<b>Total</b>	<b>160</b>	<b>275</b>	<b>231</b>	<b>202</b>	<b>247</b>

1) including road accidents  
 2) excluding fires caused by fireworks  
 3) 267 cases with fireworks damage were informed to the police. 96 of them caused personal injury.

Accident category	Accidents <sup>4</sup>	Fatalities	Injuries
Electrical accidents	54	5	44
Chemicals accidents	80	3	18
LPG accidents	11	1	1
Elevator accidents and damage	12	1	8
Explosives accidents	3	1	1
Use of fireworks	63		62
Pressure equipment accidents	15		4
Others (*)	9		
<b>Total</b>	<b>247</b>	<b>11</b>	<b>138</b>

<sup>4</sup>) including near-misses  
 \*) Transportable gas containers, aerosol dispensers, natural gas, transport of dangerous goods, mines

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# Plant and installations surveillance



## Automatic extinguishing equipment - part of fire safety in buildings

The regulations on automatic fire extinguishing equipment have now been in force well over a year. In that period, installation businesses have shown their qualification, and have been duly registered with TUKES. At present there are four inspection bodies which are approved to carry out initial and periodic inspections on automatic extinguishing equipment. Both the installation businesses and the approved inspection bodies are listed on our web site.

The duties applying to the owner or tenant of the building are clearly defined in the statutes. The owner or tenant of the building is obliged to see that the relevant installation certificate and its annexes are retained as long as the equipment is in service. The owner or tenant shall also

have the necessary initial and periodic inspections carried out on the equipment and keep the appropriate certificates.

For regular service and maintenance, the equipment shall have a maintenance programme. Any works carried out on the equipment are to be entered in the maintenance diary.

Automatic extinguishing equipment shall also have a nominated operator in charge and the necessary deputies. The operators' names and contact information shall be written down in the maintenance diary and be notified to the local emergency response centre and to municipal rescue service authorities. The information shall be kept up-to-date.

Certain shortcomings seem to appear in the maintenance programme, the maintenance diary, and in the nomination of the operators. Therefore it is extremely

important that both the inspection bodies and the rescue service authorities pay attention to these issues on their inspection visits.

In-service sprinkler installations shall pass the first periodic inspection on 31 August 2002 at the latest, whereas the due date as for extinguishing appliances and gas extinguishing equipment in dwellings is 31 August 2004.

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## Pressure equipment transition periods ending by law

The construction plan approvals and the design approval certificates on pressure equipment will not be valid after 29 May 2002, upon the end of the legal transition period for pressure equipment requirements. On the other hand, as to pressurised vessels and containers intended for the transport of dangerous goods, the relevant construction plan inspection certificates and type-approvals are valid also after that date.

The termination of the transition period means e.g. that the validity of the inspection certificates ends on 29 May 2002 at the latest – even if they carry a longer validity (e.g. until 31 December 2006). In case it is anticipated that the piece of pressure equipment will be completed only after 29 May 2002, it shall be manufactured according to the pressure equipment regulations. The serial manufacturing process of pressure equipment shall also be adapted to the new procedures early enough before the legal transition period ends.

The Finnish statutes on the design, manufacturing and conformity assessment are based on the European Union Pressure Equipment Directive (97/23/EC), the technical requirements of which have been adopted in our country by the Decision of the Ministry of Trade and Industry on Pressure Equipment (938/1999).

As provided by the Decision, the pressure equipment manufacturer is liable to analyse the hazards applying to his equipment on account of pressure, and then design and construct it taking account of his analysis. Pressure equipment and its design and manufacture shall be in conformity with the essential safety requirements of the Decision. The manufacture ascertains the fulfilment by following the conformity assessment procedures to be chosen on the basis of the category in which the equipment under manufacture is classified.

Since the new requirements and the conformity assessment procedures are very different from those applied earlier on pressure equipment, enough time must be taken for switching over to the new procedures – not least because of the services needed from the notified bodies.

The TUKES Publications Series Volumes 4/2001 and 5/2001 include the Pressure Equipment Directive both in Finnish and English, together with the relevant instructions for the Directive approved so far.

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## Safety of tailings dams investigated

The Finnish Environment Institute started in 1998 a project to investigate the safety of waste and tailings dams in Finland. The project aimed at studying the fulfilment of laws and regulations, whether the surveillance is attended to as provided by law, and finding out the condition and safety of the dams. The condition was studied on the basis of site visits, documentation, and owner-targeted questionnaires. The safety of these dams was evaluated both with regard to the construction-related characteristics and to the environmental impact caused by their operation and possible collapse.

There are about 20 tailings dams in Finland. On the basis of the investigation, their safety stands on a good level, the surveillance is in order, and the operation is in conformity with laws. In future, disturbances can be avoided by following the geotechnical and other regulations given on the operation, maintenance and control of the dams.

Finland has not seen severe dam accidents, but in other countries dam collapses have had serious consequences, such as the major-accident in Spain which caused million-size environmental damage a few years ago. In Finland, the surveillance of dam safety is attended to by the Ministry of Agriculture and Forestry. The regional Environmental Centres being responsible for the supervision of safety at grass-roots level, the surveillance of tailings dams is taken care of by TUKES.

The investigation results are presented in the Finnish Environment Institute Publications Series Volume No. 462 "Dam Safety Realization of Waste and Tailings Dams in Finland". (in Finnish only)

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# Product safety enforcement



## Stove surface temperatures under investigation

TUKES investigated the safety of electric stoves and had their surface temperatures measured in normal use. The project was carried out by the Work Efficiency Institute of Finland (TTS).

The stoves in general met well the requirements according to the relevant product standards. Nevertheless, consumers very often contact TUKES and the Consumer Agency because of the high temperature of the adjusting knobs and the door, window and handle of the oven. Some complaints are also made as the kitchen fittings next to the stove have darkened due to heat.

The examination included a total of 15 low-price electric stoves. The measurements were carried out with an IR thermometer and a thermoelement. Temperatures exceeding the limits determined in EN Standards occurred only in three cases – all in a plastic oven door safety latch. In all stoves, the surface temperatures on the sides was far lower to the maximum allowed value.

For the stove cover plate, there is no temperature limit, but the sides and the front are subject to maximum allowed temperatures. By way of example, the oven being at 200°C in 25°C room temperature, the oven door window temperature must not be higher than 105°C. We found two stoves whose door window temperature was close to that limit. As the oven is often used even at 250°C, surface temperatures may

become very high – even if the stove conforms with the requirements set in the standards.

The surface temperatures can be decreased, without high extra costs, by changing the stove structure in an appropriate manner. Therefore, the requirements in the standards shall be tightened to remove the hazard of burns caused by the stove front. TUKES participates in the drafting of standards. The results of this investigation will be presented to the working groups within standardisation and to the market surveillance authorities in the EES member states.

The investigation showed that on the market there are also reasonably priced stoves, whose surface temperatures at all oven temperatures remain so low that the front side cannot cause any burns. However, it is very hard for the consumer to find these models, as the technical specification is usually missing detailed information on surface temperatures.

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## Doctor's thesis to give new information on electrical fire risks

Director Veli-Pekka Nurmi defended his doctoral thesis "Risk Management of Electrical Fires" at Tampere University of Technology, Department of Industrial Economics and Management, on 28 September 2001.

Even if most electrical fires are caused by electrical equipment or installations, there have been no detailed research information available on the electrical faults leading to a fire. Also, only poor information has been available of the real causes and ignition mechanisms of electrical fires.

Dr. Nurmi's thesis identifies the electrical fire causes in various buildings, evaluates the related risks by means of the fire frequency and typical costs resulting from damage, and presents tools to reduce the identified risks.

A total of 2,000 electrical fires occur in Finland each year. Most of them happen at home, which is also the scene for a remarkable share of the damage costs involved. Health care buildings showed the largest relative fire frequency. In them the equipment which caused the fire and the reasons for fire differed very much from those in other public buildings and in businesses. The largest group of equipment causing the fire within health care was stoves and ovens, which contributed to the fact that incorrect action was very much emphasised in those cases.

Agricultural and industrial buildings accounted for the highest damage costs. Agricultural buildings also had the largest major-fire susceptibility. It was found that the time of the day and the municipal population density have a significant effect on electrical fires. Fewer electrical fires occurred in the early hours of the day (midnight to 8:00 am) and in sparsely populated municipalities (less than 20 inh. / sq. km), but there were relatively many more major electrical fires, typically with the highest damage costs.

The information presented in the thesis, owners and keepers of various buildings, whether businesses or private persons, get important instructions when evaluating their own electrical fire risks. This also contributes to an improved overall risk management.

The thesis is part of the fire safety research programme started at TUKES in 1996.

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## EU commission proposal for measuring instruments directive

The EU Commission on 15 September 2000 gave its proposal for a Directive on measuring instruments, applying to devices which in most member states are subject to requirements by law, and are used in general trade and by authorities. Examples of them are fuel meters, water meters, taximeters, and exhaust gas analysers. The document will be a so-called New Approach Directive which covers the placing of the product on the market and the initial verification. The product groups to be taken into the scope of the Directive is left to the consideration of each Member State.

The examination of the proposal started during the Swedish presidency of the EU in early 2001, and proceeded well the half-year period, but not so fast as planned. In the course of the Belgian presidency, the work also proceeded well. The target is to have the text reviewed once by end-2001. There is a wide mutual understanding about the articles and the essential requirements of the Directive, but the numerous technical annexes are still under consideration. The second and final review proceeding is due to be completed during the Spanish presidency in early 2002. On this schedule, the Directive might be implemented on 1 July 2003 at the latest. The proposal also includes a 10-year transition period allowing measuring instruments which only meet the earlier requirements to be placed on the market.

The main responsibility for the preparation of the Directive in Finland lies with the Ministry of Trade and Industry, dealing with the official deliberation of the proposal in a Council Working Party. Meanwhile, TUKES attends the WELMEC working groups to draft the proposed amendments made by the Member States and to interpret the relevant software requirements. Furthermore, a wide-angled project to determine these requirements is starting, part-financed by the EU Growth Programme and co-ordinated by PTB of Germany.

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## New directive on transportable pressure equipment

The European Union Directive on Transportable Pressure Equipment (1999/36/EC) became effective on 1 July 2001. It is to improve the safety of pressure equipment approved for the transport of dangerous goods by road and by rail on any Member State's territory, and to ensure the free movement of these items within the Community – including the placing on the market, repeated putting into service and repeated use aspects.

The transportable pressure equipment referred to in the Directive are vessels and containers intended for the carriage of gases, e.g. gas bottles. Other transport containers used by means of pressure are not within the scope of this Directive nor the Pressure Equipment Directive. They are only subject to the regulations on transport of dangerous goods.

The Directive on Transportable Pressure Equipment is the only Directive in the regulations whose starting point is the transport container or packaging as a product. A piece of transportable pressure equipment verified to be in conformity with the requirements in one of the member states in the European Economic Area can now be introduced in all other member states on the basis of a single approval procedure.

The Directive itself does not contain any technical requirements for pressure equipment. Instead, reference is made to the ADR and RID Regulations, and to the Gas Bottle Directives in force. The contents



of the ADR and RID are still missing certain parts applying to the transportable pressure equipment, since the necessary European standards are still under consideration. Due to the delay in standardisation, the Directive will be adopted in stages. First it will be applied only to pressure vessels, to be extended to containers in summer 2003. The Directive is adopted in Finland by the Decree of the Ministry of Transport and Communications on Transportable Pressure Equipment (393/2001), being applicable to:

- the conformity assessment of new transportable pressure equipment
- the re-assessment of conformity of in-service transportable pressure equipment
- the periodic inspections.

The re-assessment procedure is used to verify that in-service transportable pressure equipment, i.e. those placed on the market before the adoption of the Directive, are in conformity with the relevant requirements. The assessment is based on the examination of documents – completed with extra inspections whenever necessary. However, existing gas bottles can continue to be in their intended use, e.g. in domestic services.

Transportable pressure equipment verified as being in conformity with the relevant requirements are furnished with a p-mark (P). The equipment used in Finland shall have adequate cold resistance, which is to be indicated with the marking “-40°C”. Additionally, the inspection body which attended to the conformity assessment, re-assessment or periodic inspection shall affix its identification number on the equipment.

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## Scope of CE-marked construction products to extend

The first-ever harmonised product standard for construction products came into force on 1 April 2001 (SFS-EN 197). During the year a total of 18 new standards become effective, e.g. for geotextiles and for components of stationary fire-extinguishing systems.

At year-end 2001, there are totally 19 standards which allow the CE marking of construction products. More standards being introduced all the time, there will be 45 of them by 1 May 2002. As a whole, not less nor more than 600 standards are anticipated to be completed in the next few years. The Finnish Standards Association SFS publishes the harmonised product standards before they are adopted.

TUKES acts as the market surveillance agency for construction products authorised by the Ministry of Trade and Industry. The surveillance is focused on products brought to the Finnish market – regardless of whether they have been manufactured in Finland or in some other country within the European Economic Area, or even outside this area. As provided by the Building and Land Use Act, the market surveillance agency has the right to study the construction product, the relevant manufacturing documents and other material necessary for the evaluation of the product. TUKES is also entitled to carry out surveillance inspections and investigations.

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## Intensified guidance on articles of precious metals

The new Act and Decree on articles of precious metals came into effect in January 2001. Along with them new precious metal contents are now allowed in Finland, e.g. products with 375 parts pure gold per thousand (the so-called light gold). Articles placed on the Finnish market shall carry at least two marks: a registered responsibility mark and a three-digit fineness mark. The assaying and hallmarking of the products are now voluntary, as are the date letter and the locality mark.

There are about 700 retailers of articles of precious metals in Finland. TUKES aims at 400 surveillance visits in 2001, which means that each business will have a visit from our inspector within two years.

On our visits to the shops, production plants, work shops and trade fairs, we randomly investigate the marks on jewellery, cutlery and other articles of precious metals. We buy samples to send part of them for analysis to determine the content of precious metals and that of other metals. Nevertheless, on our visits we mainly stress the importance of guidance and dissemination of information.

The year under review saw almost 200 surveillance visits, resulting in numerous reasons for remarks. There were shortcomings in the necessary marks, or the marks were even missing altogether. On the other hand, we hardly found any under-fineness products on the market.

The statutes on articles of precious metals do not deal at all with the possible nickel in the articles. Since white gold products may contain nickel and they are sold in large quantities, we have informed our interest groups of the possible nickel contents and purchased some of those products for analysis. The tests have revealed that products said to be of palladium white gold contain nickel instead of palladium.

For the purposes of our market surveillance, we also investigated the filling of silver cutlery grips. The regulations of the Decree on the fixing method of the grip to the blade (body) are different from the established practices on the market. An amendment of the Decree is being prepared by the Ministry of Trade and Industry to allow filling of certain articles of precious metals on reasonable cause – subject to a written product description to be given to the consumer.

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## Revised brochure on articles of precious metals

The requirements regarding articles of precious metals were amended as of the beginning of 2001 with a new Act (1029/2000) and Government Decree (1148/2000). The most remarkable changes apply to the marks and finenesses indicated on the products.

TUKES has published a new brochure "Articles of Precious Metals in Finland" to substitute the earlier leaflets on this issue. There is also a Finnish and a Swedish edition of the brochure.

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