



## Investigation report

4/1995

### Fire in hotel in Kuhmoinen, Finland, 23 December 1995

This investigation report has been prepared in order to improve safety and prevent new accidents. It does not deal with possible liability or damages arising from the accident. The use of the investigation report for purposes other than the improvement of safety should be avoided.



## SUMMARY

### 1 Investigation of the accident

On the early morning of 23 December 1995, a hotel and restaurant in the municipality of Kuhmoinen in Central Finland caught fire and was partly destroyed. One person died and at least 16 persons were slightly injured in the fire. The personal injuries were slight in light of the threat posed by the accident. Over 40 guests at the hotel were in immediate danger. All the guests in the hotel were Russian tourists, and most were children.

The hotel fire was classified as an incident involving the apparent danger of a major accident. Consequently, on 28 December 1995 the Council of State appointed a board of investigation to investigate the accident from different points of view, using different methods. The most important data for the investigation have been the records of questioning conducted by the police, interviews, technical investigations, a computer generated simulation of the fire, comparative data from other similar accidents, and data collected on the general safety level of hotels. The focus in the investigation has been on discovering the cause of the dangerous situation, ascertaining what lessons could be learned, and finding ways to improve the safety level. Since possible questions of guilt are the responsibility of the police investigations, the board of investigation has not taken a position in its work on such questions of guilt.

### 2 Municipal rescue and fire services

The municipality of Kuhmoinen is a rather small rural municipality that does not have any large built-up areas. Also in its immediate surroundings there are no large towns. The area of the municipality of Kuhmoinen is 937 km<sup>2</sup>, of which almost one-third is water. On 1 January 1996 the population of Kuhmoinen was 3,209 persons.

In Finland, the municipality has the primary responsibility for fire brigades and rescue services, as with most other basic services. In relation to fire brigade and rescue services, the role of the State is primarily that of supervision and coordination. The municipality attends to the performance of its responsibility in accordance with the demands of legislation, the risk of accidents, the resources available to the municipality and the other circumstances. The fire brigade and rescue services in Kuhmoinen are typical of a small municipality. There are few civil servants proper: only the fire chief, and most of the services are taken care of by a voluntary fire brigade. Fire brigade and rescue services in the municipality are taken care of by a contracted fire brigade, the Kuhmoinen Voluntary Fire Brigade, when necessary in reciprocal cooperation with neighbouring municipalities.

The Kuhmoinen fire brigade has a rather small amount of work, 30 to 40 alarms per year. In small municipalities (other than is the case in most towns) the fire brigade does not attend to emergency medical transport. In Kuhmoinen, this is done by a private company. The fire brigade and rescue services are responsible for the emergency re-

sponse centre. At the time of the accident the municipality of Kuhmoinen belonged to a rescue service emergency district that had its centre at the fire station of a neighbouring municipality, Jämsä. The police have their own emergency response centre. The police are fully part of the State administration.

The directing of rescue services for example in case of a fire is the responsibility of the fire services, in which case the other sectors, such as the police and emergency medical transport, are subject to the general leadership of the rescue services. In the case of major accidents the regional fire chief may take over the leadership of the rescue services; the provincial government may assign this additional responsibility to one of the municipal fire chiefs in the district. In the case of this accident, the regional fire chief took over leadership responsibilities when he arrived at the scene from his own municipality.

### **3 Information regarding the site of the accident**

The "Eurooppa 4" hotel restaurant is located next to a highway but remote from built-up areas. It is surrounded by a forest, near a lake. The original motel and restaurant building had been constructed during the 1960's, and a two-story accommodations and meeting room complex had been constructed during the 1970s. At the time, they were subject to the regulations on structural fire safety dating from 1962. In Finland, more recent construction is subject to stricter requirements. The premises for guests in the hotel building have been divided into four sections, separated for the purposes of fire safety: the restaurant, the old accommodations section, and the upper floor and respectively the lower floor of the new accommodations section. In addition, the cellar, the technical premises and the stairway in the new accommodations section have, in accordance with the regulations, been separated in order to prevent the spread of fire and smoke. The total area of the building is over 1,000 m<sup>2</sup>.

The owner and purpose of the building complex has changed several times over the decades. The most recent owners had purchased it less than a year before the accident. Their business purpose had primarily been the provision of accommodations for Russian tourists. The owners and the personnel were in part Russian, in part Finnish.

## **4 Description of the accident**

### **4.1 Information regarding the sequence of events**

The early morning of 23 December was cold, windless and almost completely cloud-covered. The temperature was about -25 °C, some 1 - 2 cm of snow had fallen over the preceding 24 hours, and there was a total of some 25 - 30 cm of snow on the ground.

Two Russian groups of guests and five other persons had been lodged in the hotel building.

The first group of guests had arrived on the evening of 21 December 1995, over 24 hours before the accident. The group consisted of 34 7-18 year-old pupils from a school

in St Petersburg, their teacher and ten parents. The second group arrived at the hotel on 23 December 1995 at about 00.30, having departed from St Petersburg on the previous morning. This group included 19 persons, all adults.

On the night of the accident the hotel was almost full, with the exception of some rooms which were being renovated.

Due to the late arrival of the second group of tourists, the activity at the hotel continued until the early morning. Checking the guests in took some time, and at least a few of the guests went to the restaurant for a late-night snack. The hotel did not have a night watchman, for example a doorman, nor do Finnish regulations require this.

The last two staff members to be working, both women, left the building through the main door at about 03.25 without observing anything unusual. Many of the guests in the hotel were awake, and all were not in their own rooms, since in some of the rooms people had gathered together to socialize late into the night. Apparently the situation was quiet in the accommodations, the corridors were quiet, and none of the hotel guests were subsequently described as having been noticeably drunk. The investigation did not show that anyone would have been in the corridors while the personnel were leaving or thereafter, before the accident had been observed.

### **The initial events**

The fire had begun within fifteen minutes after the last staff members had left, at about 03.38. The guests in the hotel had noticed the fire in different ways. Some of the guests in the old section of the hotel, which was near the source of the fire, noticed unusual smells or heard unusual sounds. Some of them did not take immediate action, since they thought that what they had observed was something innocuous, such as the heating.

The alarms regarding the fire came from passenger cars that had passed by along the highway. There were an unusually large number of cars passing by, due to the Christmas traffic. A man who was the first to see flames on the roof of the hotel called the fire brigade's emergency response centre with his mobile telephone at 03.47, but he did not remain at the scene because, among other reasons, he thought that the building was still unoccupied, as it had been during earlier years. This initiated the alerting of fire brigades, emergency medical transport and the police, but at first the information was ambiguous and incomplete. Within ten minutes of this first emergency report two more cars arrived at the scene, one of which happened to have a student attending a fire chief training course. He used his mobile telephone to make a new report to the emergency response centre at 03.56, at which time the authorities realized the seriousness of the accident. The passengers in these cars began actively to assist the guests in the hotel.

### **Action by the fire brigade**

The first Kuhmoinen fire brigade vehicle left the fire station towards the scene of the accident at 03.58, with five firemen. It had taken some time to receive the alarms, since the mobile telephone calls had, for technical reasons, first been routed to a more distant

centre, and only then had gone to the appropriate emergency response centre. The first fire brigade units received the alarm at 03.51, and the subsequent departure of the Kuhmoinen volunteer fire brigade took place in slightly over five minutes, since the men had to arrive at the fire station from their homes. The fire brigade vehicle arrived in the yard of the hotel at 04.06. During this time a second vehicle left the Kuhmoinen fire station for the scene of the accident. The alarm had also gone out to fire brigades in two other municipalities, and despite the distance to them, they provided a significant amount of fire brigade and rescue services at the hotel.

After the initial phase of the extinguishing of the fire and the rescue, the subsequent work on putting out the fire and clearing the debris continued with the help of several units from the three fire brigades. The work of the fire brigades at the hotel was not completed until at 15.00 on the following afternoon.

### **Transport of the injured**

The first ambulance to arrive at the scene of the fire came at 04.13. After having ascertained the situation for some time at the scene, the ambulance drivers began to attend to the injuries of the hotel guests. The hotel personnel had placed the injured children in one part of a duplex house located next to the hotel.

A man who was not breathing was found by the firemen on the corridor between the old and the new section of the hotel. The firemen attempted to resuscitate him. Even resuscitation attempted in the ambulance did not prove effective.

The ambulance drivers examined and attended to the children's injuries. A second ambulance arrived at the scene at 04.31, and took three children to the nearest hospital. The first ambulance to arrive at the scene took four patients to the hospital. A local taxi drove to the hospital twice, taking a total of six patients. At the hospital, the patients received the necessary first aid. However, the recording of information on the patients and on the treatment remained incomplete because of the sudden arrival of so many patients at once, and because they were foreigners who did not speak Finnish and who left the country soon.

### **Action by the police**

At 03.52 the Jämsä emergency response centre notified the Jämsä police that a passing car had reported that the Eurooppa 4 hotel was on fire. The on-duty officer assigned a patrol car to the task at 03.53, when the patrol was just about to go off duty. The patrol left the police station for the hotel at about 03.58. In order to verify the report, at 03.59 the on-duty officer called the driver who had made the original report.

Police operations at the scene of the accident was initiated with the arrival of the patrol car from Jämsä at 04.18. This patrol focused primarily on obtaining preliminary information and on guiding traffic in order to safeguard the work of the fire brigade. The second police unit to arrive at the scene, a criminal investigation patrol, initiated the investigation by speaking with the Russians with the help of a Russian interpreter on the Russian staff of the hotel, and by speaking with the Finnish rescuers on the scene. The technical in-

Investigation of the site began when a provincial technical criminal investigator arrived at the scene at about 06.00. In Finland, the police have the responsibility for the investigation of the cause of fires.

Interviews with the Russians continued with the help of an interpreter who had been brought to the scene. These interviews were conducted in temporary facilities in a Jämsä hotel, and lasted from the morning to the afternoon. The staff of the hotel were interviewed at the Jämsä police station throughout the day.

The police continued to investigate the cause of the fire with technical investigations and interviews for about a year, and assisted the board of investigation in the investigation of the accident. With the assistance of the police and the St Petersburg militia, the board of investigation met in St Petersburg during the autumn of 1996 with people who had been involved in the accident, and heard their description of the events. Subsequently, the St Petersburg militia assisted further in obtaining additional information.

The police had sent the matter on for the consideration of charges, and this has led to the bringing of charges for negligence against the hotel owners and against the fire chief responsible for the fire inspection. At the time of the completion of the report of the board of investigation, the trial is still in progress.

### **Social services**

The municipality arranged for temporary accommodations, and the Jämsä section of the Finnish Red Cross took care of the practical arrangements and paid the expenses. The Red Cross also saw to the obtaining of personal effects for those who had lost their clothing in the fire, and took care of the provision of food.

### **Mental health services**

Almost all of the hotel guests who had been a victim were distraught by the events. The crisis team from the Jämsä health centre began to provide mental support to the guests at the hotel at 18.00 on the evening of 23 December 1995. The adult victims were divided into two groups, one with and one without children. Both groups went through debriefing, but due to the language problems it was more cumbersome than usual to go through the process with the help of interpreters. The Salvation Army and private individuals provided donations to the victims of the accident. A Christmas-themed celebration was organized for the children at the hotel.

## **4.2 Personal injuries**

A 49-year-old man who had been working on the reconstruction of the hotel and who was staying at the hotel died during the fire. The cause of death was carbon monoxide poisoning. The man had been intoxicated during the night and he was most probably the third last person in the restaurant before the fire.

According to what was ascertained in the investigation, 14 of the Russian tourists who were staying at the hotel as guests and two of the rescuers were injured. Twelve of the group from the St Petersburg school were injured, and their injuries were diagnosed first in Jämsä and then in St Petersburg. The more serious injuries were a fractured foot and a fractured finger, and sprains or other similar injuries of the back or joints. Most of those who were injured had been cut in the legs and arms by glass when they had jumped out of the window.

Two men out of the group of adults who had arrived on the night of the accident were injured. They had been cut on the hand by glass.

In rescuing the victims of the accident, two of the first outside rescuers received cold-burns on their bare hands from the metal stepladder. The second of these two rescuers was also otherwise frostbitten.

Several of the parties concerned had mental trauma as a result of the accident. According to the information that has been received, this consisted of at least insomnia, nightmares and anxieties that have been manifested as stuttering.

#### **4.3 Material losses**

The restaurant was completely destroyed in the fire. The old section of the hotel was so badly burned that it cannot be repaired. The new accommodations section of the hotel suffered primarily from smoke damage. The material losses to the building in the fire totalled about 3,8 million marks (ca. USD 700,000). The damage to the furnishings was about 0,3 million marks (ca. USD 55,000).

### **5 Analysis of the accident**

#### **5.1 Arrangement of a simulation of the fire**

The accident investigation board requested that the State Technical Research Centre arrange for a simulation of the fire in order to ascertain the source and spread of the fire in various probable scenarios.

According to the simulation test, the fire most probably originated in the lobby of the hotel. The fire had ignited at about 03.38. The entire lobby had been enveloped in flames within about six minutes of ignition, at about 03.44, which, according to the tachograph is the same time as a lorry driver had driven past the hotel and had seen nothing unusual about the building. The lobby windows had broken about three minutes later, at about 03.47, by which time at the latest the fire could be seen from outside. The folding door between the lobby and the restaurant had been burnt through, the restaurant had broken out into flames at about 03.47, and the restaurant windows had broken at about 03.53.

The smoke and gases had spread through the open fire doors to the accommodation sections, and in all of the corridors of the upper level had come down to a height of

about 0,5 metres from the floor at about 03.51. At the latest at this point the situation had posed a mortal danger to the life of the guests housed in the old section and in the upper floor of the new section. The smoke and gases spread to the lower floor of the new section only briefly, and did not pose any immediate mortal danger to the guests housed therein. The temperature scarcely rose in the lower floor of the new section, and even on the second floor of the new section did not rise to a dangerous level. In the accommodations in the old section, not only the smoke but also the temperature had posed a mortal danger to the guests.

On the basis of the results of the simulation of the fire, and of the observations made by the hotel guests and the first rescuers, the board of investigation has made the following conclusions regarding the danger to the safety of the guests. When the first guests had discovered the fire and were seeking to escape the building, the situation in the accommodations in the old section had posed an immediate mortal danger, and the situation on the second floor of the new section had posed a mortal danger. A total of 42 persons had been in mortal danger during the fire, and six of them had been in immediate mortal danger. The remaining 27 persons had been in lesser danger than the others.

## **5.2 Assessment of the cause of the fire**

The restaurant in the hotel had been destroyed so thoroughly that it is very difficult to obtain reliable information on how or (with certainty) exactly where the fire originated. However, during the course of the investigation it has been possible to note with certainty that the fire originated inside the restaurant building. It has been possible in the investigation to rule out the summer terrace and the kitchen as possible sources of the fire in the restaurant building. On the basis of various investigative methods it would appear that the most likely origin of the fire was the lobby of the main entrance.

No possible origin of the fire under these circumstances could absolutely be ruled out. According to international statistics, the most common reasons for hotel fires have been smoking, arson, electrical appliances and the preparation of food. Such reasons have all been possible in the case of the present accident.

According to eyewitness accounts reported to the board of investigation, technical investigations and conclusions based on the simulation of the fire, the fire has most probably been caused by a burning cigarette or, secondarily, by an electrical appliance. It has not been possible to absolutely preclude the possibility that the fire had been set deliberately, but the investigation has not shown any evidence of this.

## **5.3 Factors contributing to the dangerous incident**

According to the assessment, structural reasons, the safety arrangements, the municipal fire prevention services, the initiation of the rescue operations and the weather have all contributed to the dangerous situation.

The fact that the fire doors have improperly been kept open has been the most fatal mistake in this fire, when seen from the point of view of the origin of the dangerous

situation. It was possible for the fire, the smoke and the gases to spread without hindrance from the restaurant to the accommodations, placing 42 persons in mortal danger.

The fact that fire detectors were missing from all of the premises in the building slowed the alarming of the guests regarding the fire. In addition, after many guests had made their first observations, they remained uncertain in the situation since no alarm or anything similar could be observed. This has slowed their rescue. As a consequence of the absence of fire detectors, the corridors in the old accommodations section and on the second floor of the new section had time to be filled with smoke before the guests had been informed about the fire and had evacuated the rooms lining these corridors.

There were also other defects in the hotel safety arrangements, such as the absence of an evacuation plan or of instructions intended for the guests.

The structural problems that have promoted the spread of the fire are primarily due to the fact that, at the time that the hotel had been built, unsafe structural approaches had been allowed, approaches that were subsequently no longer allowed.

#### **5.4 Analysis of rescue operations**

Most of the hotel guests had themselves noted the fire, either because of the smell or because of odd noises. This had occurred at about the same time as the bystanders who had initiated the rescue operations had arrived in the hotel yard. Some of the guests had still been awake at the time the fire started. The fact that all guests were awake or woke up rather quickly assisted in the performance of the rescue operations.

In addition to the bystanders, also the hotel guests rescued one another, for example by holding out blankets into which people could jump. Some of the children evacuated the building by jumping down to the ground.

Apparently all of the guests who had been lodged on the second floor of the new section of the hotel had evacuated the building or been rescued through the windows. The fact that all of the guests on the second floor had been rescued from mortal danger had been facilitated by the fact that they did what they should have done. No one went out into the smoke-filled corridor; instead, everyone realized that in this situation the window was the only evacuation route.

Because the hotel guests had evacuated the building on their own or had been assisted by bystanders, all of the hotel guests, with the exception of the one construction man who died, left the building quite quickly. This has been a significant factor in limiting the amount of personal injuries.

#### **Rescue and fire services**

The principal defect in the municipal fire services has been in the quality of fire inspections, since insufficient attention had been paid to serious defects, and the remedying of these defects had not been checked. There is also reason to criticize the initial actions

of the fire brigade at the scene of the accident, primarily in respect of the lack of experience and determined leadership. Delays were noted in the sending out of alarms, which had been due to the system as a whole and to the deficient instructions.

According to the simulation the fire had broken out into flames 22 minutes before the fire brigade and rescue operations had been initiated. On this basis it can be concluded that in practice nothing could have been done at the time the fire brigade arrived to rescue anything in the restaurant, the lobby and the old section of the accommodations. The possibilities of rescuing people were limited to the new accommodations section. In extinguishing the fire, the only thing that had been possible in practice was to protect the new section by limiting the fire to the old section.

### **Medical rescue operations**

Medical rescue operations at first proceeded spontaneously from the time the first ambulance arrived. No first-aid station proper was set up. There would have been reason to prepare for a systematic triage (establishing the priority with which patients should be treated), since the personal injuries could have been significantly greater. In addition, the hospital had been insufficiently informed about a possible major accident. The information had not been passed on until the first transport of patients.

The hospital took in several foreign patients, and insufficient preparation had been made to receive them. For this reason, there were defects in the recording of information regarding the patients and the treatment.

### **Police operations**

In part due to language difficulties, the hotel guests were not fully questioned. It had not been possible to question almost at all the guests who had arrived on the night of the fire, since they had hurriedly continued their journey during the morning. The group had been asked to provide, among others, a list of its members and a statement of possible injuries and losses, but the group had returned to the Russian Federation without providing the police with any information at all. The hotel registration cards of all of the guests staying at the hotel at the time of the fire had been destroyed in the fire.

It had not been until later that the police had received confirmation on whom had been in this group. The absence of information had also hampered the work of the board of investigation; it had not been possible to question the members of the Russian groups until the autumn of 1996, nine months after the accident, after the personal data had been ascertained.

Insufficient resources had been obtained for the effective questioning already in part at the scene of the accident of the persons involved. This was particularly the case in the hotel in Jämsä to which the guests had been transferred from the scene of the fire. In Jämsä, the police had been assisted by a Russian interpreter, but at least one other interpreter would have been needed. The fact that the incident occurred over a weekend and just before Christmas had on their part hampered the obtaining of additional personnel.

## 5.5 Conclusions

There were several reasons for the accident. The way in which the fire was caused is not known for certain, but several factors relating to the culture of safety have influenced the scope of the damages and the danger of a major accident: not everything had been done that could reasonably have been done and that normally would be done to prevent the accident and minimize the possible losses from the accident. The most apparent omissions in respect of the culture of safety were in respect of the fire doors, the fire indicators and the instructions.

There were many reasons why the accident could have been much more serious. This would have apparently been the case if the structure had been weaker (for example if the walls would have been made of wood instead of brick); if the old and new sections of the hotel would have been served by the same main electricity distribution board, other than was the case here; if the guests had not been able to act so rapidly for example due to their age, invalidity or intoxication; if part of the guest rooms in the more dangerous parts had not been empty due to the reconstruction; and also if there would have been less traffic than there actually had been on the road, due to the approaching Christmas holidays.

The accident could have been avoided if its cause, apparently a cigarette or a faulty electrical device, could have been prevented. The personal injuries would apparently have been less, the risk of serious personal injuries could have been lower and the material loss could have been smaller if the fire doors had been used correctly and if the fire indicators would have been working. If the fire could not have been prevented, than at least its dangerousness and destructiveness could have been significantly lessened through ordinary safety precautions.

## 6 Recommendations

### 6.1 The culture of safety

**R1 An integrated culture of safety should be established in the hotel trade, and working group should be established to monitor the development of such culture of safety.**

On the basis of the investigation that has been conducted, the board of investigation has received the clear impression that there continue to be serious lacks and omissions in the fire safety of many hotels. Fire doors are wedged open, there are defects or malfunctions in detection and alarm systems, there are defects in the usability of evacuation routes and in signs, and either there are defects in preparations for an accident, such as in evacuation plans and in safety instructions for hotel guests, or there are no such preparations at all. All the parties concerned should undertake to improve the level of safety.

The culture of safety requires that the management of a hotel commits itself to safety-related matters, to continuous maintenance of safety, to organization and to



the regular training and motivation of personnel. The culture of safety can be used to get all levels in an organization to regard safety-related matters with sufficient seriousness and thus to play their own role in the maintenance of safety.

**R2 A system of classification of the fire safety of hotels should be created so that hotels can demonstrate their fire safety level and guests can take this level into consideration when selecting a hotel.**

**R3 The requirements of the EU Council recommendation regarding the fire safety of hotels (86/666/EEC) should be implemented in Finland.**

(Even though the level of fire safety norms on Finland is high, not all EU norms have been implemented.)

## 6.2 Structural fire safety

**R4 Lodging houses should have an effective fire detection and warning system that extends to the key premises from the point of view of risk. This should primarily consist of an automatic sprinkler or fire alarm system and secondarily, primarily in small premises, a fire warning system that is connected to the electrical network. The detection system should extend to the entire building or set of rooms used as accommodations. In selecting the system, consideration should be paid to any delay in the initiation of fire brigade and rescue operations. The detection system should immediately notify hotel guests of any fire detected. The evacuation of hotel guests should be initiated within ten minutes of detection of the fire by the detection system.**

The present regulations and guidelines regarding automatic sprinkler systems and fire detection systems are sufficiently specific, but the regulations and guidelines on fire alarms, fire alarm series and fire alarm systems are subject to interpretation. On their basis, it is also possible to install and approve inappropriate solutions. Such regulations and guidelines should be made more specific.

**R5 The technical fire classification of a building used for accommodations should at least be flame-resistant.**

(According to the Finnish classification, the structure of a flame-resistant building, P2, should withstand a fire for at least 30 minutes.)

**R6 The proper use of fire doors between sections of a building used for accommodations should be ensured. A study should be made of the significance for safety of systems that automatically close doors in the event of a fire.**

On the basis of international experience, it would appear that the wedging open of fire doors is a significant cause of the escalation of the sequence of events into major accidents, also in the case of hotel fires.

**R7 Signs indicating exit routes and other safety markings related to fire safety along exit routes should also be placed near the floor in the premises.**

**R8 Devices that close doors should be required on the doors of the guest rooms in hotels.**

A key requirement for the safety of hotel guests is that the exit routes remain free of smoke during the time required for evacuation. The arrangements for exit routes in hotels are quite vulnerable in situations where the door to a guest room remains open when the guest leaves to escape a fire in the room. In such a case smoke spreads to the hotel corridor, trapping the other guests in their rooms even if they would have several exit routes to choose from. The seriousness of such a dangerous situation increases with the height of the hotel building. The doors of the guest rooms should close automatically when the guest has left a burning room.

**R9 Guest rooms in hotels should have a balcony or a window that can be opened.**

### **6.3 Fire safety inspections**

**R10 Fire safety inspections and evacuation plans in hotel buildings should be based on risk analysis. Resources that are sufficient both qualitatively and quantitatively should be directed towards these tasks. Special qualifications, such as advanced training, should be required of those who conduct fire safety inspections in more demanding facilities, such as hotels.**

**R11 Legislation on fire prevention should be reviewed in particular in respect of the punishment for fire safety omissions or violations. The different sanctioning possibilities should be emphasized in connection with fire prevention training.**

**R12 The fire safety of furnishings should receive more attention in fire safety inspections.**

**R13 Increased attention should be paid to the fire safety of construction material used in the maintenance and repair of buildings.**

### **6.4 Rescue operations**

**R14 Practice drills, readiness and training in fire brigade and rescue services should correspond to what fires and other accidents could occur in the municipality in question. A sufficient number of practice drills should be arranged in all municipalities in readiness for any major accidents that a risk analysis would suggest as possible under the circumstances.**

**R15 Attention should be paid to the supplementing of the qualifications of personnel participating in fire brigade and rescue services provided by contracted fire brigades.**

(A considerable proportion of fire brigade and rescue services in Finland are based on the work of voluntary fire brigades.)

**R16 The reform of emergency response centres should be implemented throughout the country as soon as possible.**

(A reform of emergency fire brigade and rescue service response centres is being implemented in Finland. One problem is posed by those emergency response centres that are manned by only one duty officer.)

**R17 The provision of information in the event of major accidents should be reliable and rapid. The provision of information should be arranged so that it does not hamper rescue operations and investigations.**

## 6.5 Other recommendations

**R18 The increase in the number of foreigners should be taken into consideration in preventing and investigating accidents.**

In hotels, each guest room should have instructions in a sufficient number of languages on the procedure in the event of fires and accidents.

In order to collect contact information and information regarding the sequence of events from those foreigners who have been in an accident, a data collection form should immediately be available in a sufficient number of languages, since foreigners often leave the country soon after an accident. Forms in different languages could be included, for example, in the national information system operated by the police.

A study should be made of the legal protection of, and practice regarding damages in relation to, foreigners who have been involved in an accident. The fact that foreigners soon leave the country makes it more difficult in part to protect their interests.

**R19 Cooperation between the police and the fire authorities should be developed in respect of the investigation of the cause of fires and the investigation of fires.**

(The police have the responsibility for the investigation of the cause of fires. Increased cooperation between the police and the fire authorities is being tested. The over-all investigation of fires and other accidents could be considerably developed.)

**R20 National statistics on accidents and the information services in the rescue field should be developed.**

**R21 Information on hotel guests should be kept in a fire-proof place.**

Information on hotel guests is needed after accidents in order to contact the next-of-kin, identify victims and investigate the cause of fires. Information on passengers is collected and stored in respect of air and passenger ship traffic for the same reasons.

The place where the information is kept should be fire-proof, or the maintenance of the information should be otherwise ensured.

**R22 Investigation should be further developed.**

Information should be received quickly from entities responsible for telephone lines and electrical networks regarding interruptions in service, since part of such information is recorded only for a brief time. This information can be used to assess the time at which equipment was destroyed, and in this way how the fire developed.

Air photography necessary from the point of view of the investigation should be carried out quickly so that the situation can be recorded in as unchanged state as possible.

At least one of the first-response units in fire brigades should have a video camera for the documentation of the development of the accident. This video camera should be installed in the vehicle, and it should operate automatically. In addition, the fire brigade should have reliable photography equipment in order to record the events in the accident. The use of photography in fire inspections should be considered at least in order to record information on the inspection of special risk targets.



## ADDENDUM:

### Legend of photos and drawings in the Finnish text

#### pages 4-5

- Map: The site of the accident (at the head of the arrow).
- Map: Regional divisions in rescue service in central Finland, 1995 (bold line = province, medium line = cooperation area in rescue and dispatch services, narrow line = municipality, dotted line = main highway, H = hotel "Eurooppa 4").

#### pages 13-15

- Drawing and photo: Aerial views of the hotel from the west.
- Photo: A bird's-eye view of the hotel from the east.
- Photo and drawing: The front door side (eastern side) of the hotel.

#### pages 20-22

- Photos: Smoke detectors were not fixed on the ceilings but stored in boxes.
- Photos: Copies from a video tape recorded 1 and 2 November 1995 show (1) an open fire-door leading from the fireplace lounge to the corridor of the old part of the hotel and (2) the restaurant seen from the lounge bar.
- Photos: Pictures taken earlier in 1995 show sections of the restaurant, (1) one the three loges on the eastern side, (2) tables facing the lake, western side.

#### page 27

- Map: Risk areas according to the analysis (II highest, IV lowest), division of dispatch areas (A, B, C) with the neighbouring municipalities, response times of fire service in minutes (10, 20).

#### pages 28 and 30

- Drawing: Upper floor of the building and the location of the hotel guests before the accident (codes: number = group of persons; alphabet = sex and age; capital letters identification by name).
- Drawing: Bottom floor, as in the preceding drawing.

#### page 34

- Graph: Response time of fire engines and ambulances to the hotel (alarming dispatching - starting - driving time).

#### page 37

- Photos: The newer, northern end of the hotel some hours after the fire.

#### page 40

- Photos: Extinguishing the fire one hour after the beginning of the fire.

#### Page 43

- Photo: Some of headlines in the press telling about the near disaster and comfort given to the Russian guests.

#### pages 48-54

- Drawing: Upper floor of the building, level of damage (red = total destruction, pink heavy damage, yellow = damage by smoke) and the fire sections.
- Drawing: Bottom floor of the building, as in the preceding drawing.
- Photos: The entrance door and the restaurant.
- Photos: The old part of the hotel.
- Photos: The room of the deceased person (above), and the end of the corridor in the new section facing the older part (left) and the staircase (right).

- Photos: The upper floor corridor in the new part; the deceased man was found lying on the front side of the corridor (upper photo).
- Photos: The bottom floor in the new section.

pages 58-60

- Table: Timing of the events.
- Table and photo: Timing of the events and a view from the east at 04.20 hours.
- Table: Timing of the fire process according to the simulation model.

pages 62-63

- Photo: A copy from a video tape recorded 2 November 1995 showing the entrance with the illuminated shield.
- Photo: A copy from a video tape recorded 1 November 1995 showing some electrical appliances in the restaurant.

pages 66-68

- Drawing: Furniture and other fire load shown on a map of the entrance lobby, lounges and the restaurant (the area where the fire began according to the conclusions is surrounded by a dotted line).
- Photos: Copies from a video tape recorded 2 November 1995 showing the bar lobby (above) and the fireplace lounge.
- Photos: Reconstruction of the sheet-iron roof shows the worst damaged area above the entrance lobby; remnants of a padlock as evidence of the locked folding door between the entrance lobby and the restaurant hall.

page 71

- Photos: Views from the restaurant to the entrance lobby (above) and from the lobby to the fireplace lounge and to the hotel corridor, where the fire-door fixed open is seen.

page 88

- Photos: Some examples of defects in other hotels in Finland; an exit door sealed by high snow (above), a fire-door jammed open with a sofa and an exit light switched off during a black-out.