

September 6, 2022
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REDEFINING THE CONCEPT OF WORKPLACE "RISK" IN SWEDEN

ELIMINATING THE NO-RISK
AND HEALTHY OFFICE
RESEARCH PROJECTS

“

That which is not spoken of – it is taboo. So that no one steps over the boundary, there are guardians who, via lobbying or mobbing, disarm those who are guilty of the unacceptable. At the same time this means that the free furtherance of knowledge, the prime task of researchers, is hindered.

French philosopher Michael Foucault

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Redefining the concept of workplace “risk” in Sweden:

Eliminating the No-Risk and Healthy Office research projects

“Low dose exposure to chemicals and electromagnetic radiation from increasingly advanced electronic equipment is apparently one of the work environment risks in offices in the twenty-first century. How great the health risks are is not yet known. Researchers who want to find out are kept back by constant lack of funding. In this situation, the role of unions is important, partly with respect to demanding more adequate research in this field, partly to assert at least the principle of prudent avoidance – if they don’t dare to demand a zero-risk goal.”

Former TCO journalist and author Gunni Nordström in “The Invisible Disease”

INTRODUCTION

During the 1990's the Swedish trade union movement, notably the Swedish Confederation of Professional Employees (TCO), the central organization for professional workers, and the Union of Clerical and Technical Employees in Industry (SIF), the largest trade union within the TCO, led the world in actively tackling, and working on solutions for the growing problem of both chemical and electromagnetic pollution in the workplace. At that time, SIF was the largest trade union for white-collar workers in Sweden until it merged in January 2008 with another trade union (HTF) to form a new organization, Unionen which is now Sweden’s largest trade union in the private labour market and the largest white-collar union in the world.

The TCO label is known internationally for its precautionary environmental standards for computer monitors that limit electromagnetic radiation (EMR) and chemical emissions (TCO’92, TCO’95, TCO’99 and TCO’03). Although not eliminating EMR and chemical emissions from computer monitors, it was ground-breaking in that it was the first case of a union organization, representing both members and consumers, successfully influencing manufacturers to improve the design of their products to reduce potentially harmful emissions. TCO recommendations have become an international market standard, which all computer monitor manufacturers do their best to comply with to be TCO-Certified. The TCO monitor standard is quite extensive, covering the environment, ergonomics, usability, emission of electric and magnetic fields, energy consumption and electrical and fire safety. Restrictions are placed on the use of heavy metals, brominated and chlorinated flame retardants, CFCs and chlorinated solvents that can outgas into the office environment during operation. There are also requirements for eventual recycling as well as the manufacturer to have an environmental plan in place. The TCO philosophy is that workplace environmental risks should be eliminated as far as possible.¹

Following on from TCO initiatives, Kjell Fransson at Sif initiated an inquiry into hypersensitivity to electricity. At about this time (1996) Åke Bergman at Stockholm University unexpectedly found traces of brominated flame retardants in the blood of people tested. When this was reported in the Swedish media several people who claimed that they were electrohypersensitive contacted Bergman, requesting that he also test their blood. Testing by one of Bergman’s team found that the electrohypersensitive people did have these

¹ Nordström, G. The Invisible Disease: The Dangers of Environmental Illnesses caused by Electromagnetic Fields and Chemical Emissions, 2004, Chapter 17, TCO-labelling and the zero risk goal.

chemicals in their blood suggesting that electrohypersensitivity, in some cases, may have a chemical element.

As a result of these findings, Bruno Hagi who worked specifically on work environment-related issues at the central SIF headquarters became interested. Hagi, concerned that the information technology (IT) workplace may be creating new and serious risks to health, initiated the SIF No-Risk project, enlisting the involvement of a team of researchers, including Martin Andersson from LIBEREL AB² and Assoc. Prof. Olle Johansson from the Karolinska Institute.³

Similar to the TCO philosophy, the SIF No-Risk project aimed at practical measures to reduce or eliminate EMR and chemical emissions in the modern office but took the concept further to include all aspects of the modern IT office.

To quote from the SIF publication, No-Risk in the IT environment (1998):

*The NO RISK project devised by SIF for the IT environment is one example of new thinking, a completely new model for applying trade union influence to development by using the “consumer power” of the members. Only products and equipment that can meet tight environmental requirements shall be considered when negotiating, with a view to improving the working environment for the employees, while reducing Nature’s burden.*⁴

In order to gain a better understanding of the extent of the SIF No-Risk project the following is extensively quoted directly from various 1990's SIF documents reproduced in this publication. Unfortunately these documents are no longer available from SIF's successor Unionen and there is no mention of the No-Risk project on their website. It is as if it simply never existed for reasons examined in this paper.

Overview of the SIF and related research initiatives

1992: The National Institute of Occupational Health in Solna, Sweden published *Health and well being at VDU-work*, which examined a number of causes of work related illness symptoms. These were listed as *Chemical & biological factors, Electrical & magnetic fields, Display terminal work, Psychosocial factors, Office climate and Paperwork*.

1993: *SIF carried out an extensive enquiry into hypersensitivity to electricity among its members. The reason for the enquiry was increased concern and problems from an ever-increasing use of electricity. All SIF members were afforded opportunity to describe symptoms of hypersensitivity to electricity. A club questionnaire was also included with questions to union sections, white collar worker clubs and work place ombudsmen. At the end of 1994 SIF presented a final report in which the responses to the questionnaires had been scientifically processed. According to the report many SIF members were affected. Up to one in ten white collar workers noted some form of trouble caused by electrical*

² LIBEREL AB was a Swedish office design company specializing in environmental office place sanitation (Appendix C)

³ Private communication with a number of people directly involved at the time. Also see Nordström G, *The Invisible Disease*, O Books, 2004, page 217-218.

⁴ No Risk in the IT environment, SIF, 1998 (Appendix A)

apparatus. An estimated 6,700 cases of hypersensitivity to electricity were found among the union members.

1995: A twelve-page summary, "Hypersensitivity to electricity", was made of the final report. It attracted considerable attention and was translated into German and English. In easily-understood form it presented facts about hypersensitivity to electricity, who is affected by it, where and how symptoms appear, and a plan of action.

1996: SIF compiled a new report. "Hypersensitive in IT environments". This aroused considerable interest since the results in 1993 had been so alarming. Had the members' problems increased or decreased? The new report shows that the problems have increased. The number of SIF members who complained that they have serious or extremely serious problems had doubled in two years.⁵

*In 1998 SIF published the 35 page report, "No Risk in the IT environment"
Section headings from the No Risk document:*

- The IT society is creating new and serious risks to health*
- New technology provides new possibilities but also new problems*
- What does NO RISK mean in the IT environment?*
- Why is NO RISK needed in the IT environment?*
- It's the invisible health risks that are causing problems nowadays!*
- An electrostatically charged speck of dust can contain all this⁶*
- Today's electrical power supply units generate high frequencies which increase the risks*
- Our most commonly used strip lighting gives out large amounts of unnecessary emissions and radiation*
- Good equipment is already on the way to presenting a NO RISK environment*
- How dangerous are our mobile and cordless telephones?*
- Stress often lies behind the most common reasons for sickness absence*
- Is NO RISK possible or just plain ridiculous?*
- High environmental demands favour exports*
- It's a matter of prevention, prevention and even more prevention!*
- The needs of our members started the build-up of knowledge and gave birth to the idea of NO RISK in the IT environment*
- The NO RISK project paves the way to ensuring that obvious health risks shall not be present in the future office environment.*

In 1999 SIF initiated the "Healthy Office project" in partnership with the Luleå University of Technology (LTU). The project aimed at implementing the points raised in the SIF "No Risk" publication. Many other organisations were involved in the project, including Arbetslivstjänster AB, a private company owned by several trade unions. The company investigates and rehabilitates workers who have suffered various work-related injuries, both physical injuries, mental stress, as well as functional impairments.⁷

⁵ *Hypersensitive in IT environments: Information concerning problems caused by hypersensitivity to electricity. Facts and advice to members of SIF, SIF, 1996 (Appendix D)*

⁶ *Pollins, pesticides, anti-oxidants, allergens, bacteria, viruses, solvents, dyes, furanes, dioxins, formaidehyde, flame retardants, ozone, mites, carbon black, chlorinated hydrocarbons, trichlorethyl phosphates.*

⁷ *Eriksson, J.I., Electrical Sanitation Activities, The Healthy Office Newsletter, No.1, 1999. (Appendix B)*

To quote in part from The Healthy Office project newsletter.

The past few decades have been a time of opportunities. Technological development has completely changed conditions for how we humans live, work and communicate; still, we have only begun to scrape the surface of possibilities. At the same time, new technology and new materials give rise to important questions about working environments and our health. Concern about electromagnetic radiation and chemical emissions grows all the more. Scary scenarios are mixed with “calming” reports. It becomes more and more difficult to decipher between truth and speculation. The Healthy Office project aims at informing and educating others in questions concerning modern electrical environments and office environments. Our main aim is partly to eliminate/reduce chemical emissions from materials that are used in offices, and partly to reduce/eliminate radiation from electrical apparatus in such environments.

The project is backed-up by a whole spectrum of interested parties, from national organizations to local companies. Swedish and international researchers, each leading experts in their respective fields, are also tied to this project. Lars Tornberg, Project Leader of The Healthy Office project, emphasizes the importance of organizations such as SIF acting as a driving force in the development of projects such as this. With their project, No Risk in IT environments, SIF stands for a new way of thinking that will give new pace to product development connected to environments that frequently convey information, says Tornberg. Providing information to the community is made easier when the project has this platform to work from, says Lars Tornberg. In this way, we hope to contribute to spreading objective information and reaching a better understanding of the problems that exist concerning workplaces that give off chemical emissions and electromagnetic fields, says Tornberg”.⁸

In 1997 in a paper by Anna-Christina Blomkvist examined a 1992 Swedish government project on “Hypersensitivity to electricity” obviously sparked off by the 1990s SIF initiatives. In what might be considered a bias in the government investigation is the statement that “*psychological explanations to electrosensitivity, which were given priority to by the National Board of Health and Welfare (1995), focus on the individual*” In other words, an emphasis on the psychosocial work environment, with little attention apparently given to possible environmental factors, such as chemical emissions from office-place equipment. The possibility of this having a toxicological significance for “hypersensitivity to electricity” may be an important factor that was not addressed if we consider the following statement in the conclusion of the Blomkvist paper:

Answers from nonafflicted persons (exposed workers with no apparent health symptoms) in this study showed that there were disturbing effects from computers, and the new generation of computers with hard drives and fans are too often noisy and probably generate more heat than the previous generation. The afflicted persons opened windows, turned off computers, or limited time at the computers, thus counteracting the negative

⁸ Tornberg, L, (ed: *The Healthy Office Newsletter, Truth & Consequence: News & Information from the Healthy Office*, No.1, 1999 (Appendix B)

*effects indicated by the nonafflicted.*⁹

The potential for health hazards from exposure to chemical emissions from computers and other electrical equipment in the office environment was examined in the SIF No Risk pamphlet (Appendix A)

In 2008 a paper was published in *Atmospheric Environment* that reviewed the available data and information specific to indoor chemical pollutants emitted by office equipment. The Abstract starts with the statement:

*There is concern that potentially harmful pollutants may be emitted from office equipment. Although office equipment has been a focal point for governmental efforts to promote energy efficiency through programs such as the US EPA's Energy Star, little is known about the relationship between office equipment use and indoor air quality, and information on pollutant emissions is sparse.*¹⁰

A list of some of the chemicals examined in the paper included volatile organic chemicals (VOCs), ozone, particulate matter and several semi-volatile organic chemicals (SVOCs) such as phthalate esters, brominated flame retardants, organophosphate flame retardants and polycyclic aromatic hydrocarbons (PAHs). The possible causative role of these chemicals in the condition termed "hypersensitivity to electricity" is still unknown with little research presently being done researching a possible connection.

In 2001 SIF published a NO Risk update in 1998, in Swedish only with essentially the same information as in the 1998 version.

A redefinition of Risk in the workplace

However, by 2007 SIF's above activities were no longer a priority in a changing political climate. In spite of the extensive work that had been done by SIF throughout the 1990's and early 2000s, by 2007 no mention of any of the above documents, or the outcome of the Healthy Office project was on the SIF website.

On May 30, 2007, Assoc. Prof. Olle Johansson a former member of the SIF No-Risk project rang SIF headquarters asking for copies of the 1990s publications. When asked for copies of the before-mentioned SIF publications they replied that they had run out of copies and no further printing was planned. As for the Healthy Office Project, they could not find it and did not even know what it was. However, SIF's one English publication available on its website at the time was titled: *SIF: Sweden's Leading White Collar Union (2005)* and did have a revealing section titled: *The work environment*.

To quote from page 7:

Objective: The work environment should promote health, development and security in order to ensure the health and well-being of SIF's members at work. SIF should therefore: Support the members so that they gain a greater degree of influence over their work

⁹ Blomkvist A-C, "Hypersensitivity to Electricity" in the office; Symptoms and improvement, Lulea University of Technology, Sweden, *Int. Journal of Occupational Safety and Ergonomics*, Vol. 3, No. 3-4, 129-140 (1997)

¹⁰ Destailats, H, *et al.*, Indoor pollutants emitted by office equipment: A review of reported data and information needs, *Atmospheric Env.*, Vol 42: 7, pp. 1371-1388, 2008

*situation. SIF should offer services and tools that increase the members' capacity and ability to influence their work environment. Influence companies to invest in preventive work environment measures, particularly with regard to the psychosocial work environment, where the question of working hours is also an important factor. An integrated approach to the work environment contributes to the development of the companies. SIF should recruit more local work environment representatives and develop the system for regional work environment representatives. SIF should also focus on work environment training for managers, work environment representatives and employees so that everyone can actively contribute to systematic efforts to improve the work environment. Influence society so that the preconditions for a healthy working life are improved. SIF should work for greater resources for regional work environment representatives, training on the work environment and corporate health services. By co-operating and exerting influence, nationally and internationally, SIF should involve employers, authorities and other players in the work to improve activities concerning the work environment.*¹¹

In the 2005 SIF publication nothing was mentioned about the previous emphasis on chemical and EMF emissions in the work environment and nothing more was said on the SIF website about these two previously high-profile environmental trade union issues.

What was apparent in the 2005 SIF documents was that the previous emphasis on chemical and electromagnetic hypersensitivity in the office environment had been replaced with an emphasis on the "psychosocial work environment"¹². This would suggest that all those hypersensitive employees identified by SIF investigations in the 1990's were now considered to be more of a psychosocial problem. This is backed up by investigative journalist Gunni Nordström writing in *The Invisible Disease* that the before mentioned environmental diseases had been replaced by the emphasis on psychosocial problems and stress at workplaces.¹³ This may be the case when you consider that Sweden has one of the world's best workers compensation laws for work-related illnesses. However, if an employee is sick due to "psychosocial" reasons there's little chance that they will receive compensation due to workplace EMF and chemical emissions and therefore the problem will not be resolved.

Intrigued with what had happened to SIF's earlier environmental concerns over chemical and EMF exposures, and research to mitigate these, inquiries were made with several contacts in Sweden who had worked on the No-Risk and Healthy Office Projects to find out why such a radical change has happened. Was it because the Healthy Office Project had solved those chemical and EMF problems and it was no longer an issue in the Swedish workplace?

The reality, however, turned out to be quite the opposite. According to communications with a number of people who were involved with both TCO and SIF initiatives in the 1990s, starting about the time Bruno Hagi was forced to leave SIF in the early 2000's, SIF's management decided to end the union's involvement with these issues due to "political and labour-market policy considerations". Concerns were also raised at the time by a number of

¹¹ *SIF: Sweden's Leading White Collar Union (2005)*

¹² The psychosocial approach looks at individuals in the context of the combined influence that psychological factors and the surrounding social environment have on their physical and mental wellness and their ability to function. Psychosocial problems chronic anxiety, uneasiness, helplessness, fatigue, impairment of concentration, sleep disorders, mental and cognitive reservation, sexual dysfunction, infertility, psychological distress, and psychiatric disorders.

¹³ Nordström, op. cit., page 218.

SIF and TCO members that SIF was being co-opted by the Swedish telecommunications industry.¹⁴

An unfortunate coincidence sparked Hagi's departure from SIF as head of the **No Risk project**. When a major Swedish newspaper interviewed Hagi about the SIF No Risk project. Hagi mentioned in the interview his concerns over possible dangers from DECT phones and that he felt they should be removed from offices. By chance, this hit the public just as Ericsson was about to launch a major public relations event about its new DECT phone systems. Even though Hagi knew nothing of Ericsson's plans, Ericsson management thought Hagi had planned this specifically to sabotage the Ericsson DECT promotional event. As a result of the newspaper article Ericsson cancelled the event and sent a delegation of management and technical staff to complain to Bruno's supervisor at SIF. The Ericsson delegation explained why they considered Hagi was wrong about DECT phones because the system met all standard requirements. They also claimed that Hagi's actions in purposely attacking Ericsson (so they thought) were damaging the reputation of SIF in the industry. Bruno's supervisor, impressed by the Ericsson presentation, took action and soon Bruno Hagi had no choice but to leave SIF.¹⁵

Another main driver of the EMR/chemical emission environmental issues, besides Hagi, was Per-Erik Boivie, head of TCO's development unit.¹⁶ They both ended up being dismissed and replaced by new managers who were opposed to the No-Risk project. After Hagi and Boivie were gone, the issues of EMR and chemical emissions were downplayed and replaced with an emphasis on the psychosocial work environment where if an employee is sick for unknown reasons the sickness must be psychological. Although TCO Development, a company owned by TCO, was still interested in the EMR and chemical problem, a lack of funding for research had effectively put a stop to any further research on the potential hazards of EMR and chemical exposures in the workplace.¹⁷ By 2005 these occupational health and safety issues had essentially become taboo.

Silencing another inconvenient research effort in Sweden

The Swedish National Institute for Working Life (NIWL), established by a mandate from the Ministry for Industry, Employment and Communications, has been involved in workplace environment research for many decades, contributing immensely to the understanding of the many factors in the work environment's impact on workers' health. Many of the now widely accepted theories concerning occupational health and safety issues in the workplace originated through scientific studies undertaken by NIWL scientists. The many contributions by NIWL have greatly influenced the work environment in Sweden. The Institute has long encouraged a dialogue between industry, government and the workforce.¹⁸ A further blow to continuing research on occupational health and safety in Sweden came to light on December 21, 2006 when the new conservative Swedish government announced that the government intended to close down the Institute. This announcement "sent a shockwave through the international occupational health research community" and was termed a "deplorable turn of

¹⁴ Correspondence in confidence, May 30, 2007

¹⁵ Interview with Bruno Hagi by Per Segerback, June 6, 2007

¹⁶ Nordström, *ibid.* p. 217.

¹⁷ Correspondence in confidence, May 30, 2007

¹⁸ ENETOSH notice: "Shutdown of the National Institute for Working Life (NIWL) in Sweden"

http://www.enetosh.net/webcom/show_article.php/ c-29/ nr-35/ p-1/i.html

events” in an article in *Occupational Environmental Medicine*. Institute staff were notified on Sept 18, 2007 that all staff would receive notice to quit on January 1, 2008.¹⁹

According to Annika Härenstam, Professor in Work Organisation at the Institute, staff were shocked at the decision, which meant that Sweden would no longer have a platform for acting at the European and international level in the future. The government’s argument for the elimination of the Institute was that cutting taxes was the highest priority and work life issues were better left to the “partners on the labour market”, and not the government. The government’s preferred option was for all research to take place at universities, with research funded by competition, mainly through centres of excellence.²⁰ The problem with so-called centres of excellence, however, is that they tend to be academic partnerships with the industrial sector, inevitably creating conflicts of interest and bias in the centre’s ability to objectively weigh up new scientific knowledge in areas that may threaten the “bottom line” of the industry partner.^{21,22}

Throughout the 1990’s Swedish trade unions, notably SIF, were world leaders in promoting worker occupational health and safety protection from possible EMF and chemical workplace hazards – and spreading the word internationally. Now those research initiatives have been excluded from consideration for reasons quite unrelated to science and at a great potential loss to the health of office workers internationally. The elimination of the SIF No Risk and the Healthy Office Projects would seem to be the result of an informal cost/benefit analysis where the possible costs to Swedish industry were weighed as being of greater importance than the potential benefits of continuing research aimed at ensuring adequate worker, and general public health protections. Although the following publications by SIF and its working partners are no longer available due to what is essentially censorship, they are still an important record of an area of research which is just as vital today as it was in the 1990s.

Don Maisch PhD, September 3, 2022

Appendix: The publications

- A. **NO RISK in the IT environment**, *The Swedish Union of Clerical and Technical Employees in Industry (SIF)*, 1999
- B. **News and Information From The Healthy Office**, *The Healthy Office Project*, 1999
- C. **Working Environment for People and Computers**, *Liberel*, 1998
- D. **Hypersensitive in IT environments**, *SIF*, 1996
- E. **Health and well being at VDU-work**, The National Institute of Occupational Health in Solna, Sweden, 1992

¹⁹ Westerholm P., Closing the Swedish National Institute for Working Life, *Occup. Environ Med.* Vol. 64. pp. 787-788, 2007.

²⁰ Letter to the Center for Social Epidemiology from Professor Annika Härenstam, NIWL, October 10, 2006. <http://www.workhealth.org/news/nwannonoun.html>

²¹ Maisch D, Spin in the Antipodes: Political and corporate involvement with cell phone research in Australia, in *Secret Ties*, Walker M (ed)

²² An in-depth analysis of the problems of industrial/academic research partnerships is in Sheldon Krimsky’s *Science in the Private Interest*, Rowman & Littlefield Publishers, Inc. 2003.

APPENDIX **A**



NO RISK



SWEDISH UNION OF CLERICAL AND TECHNICAL EMPLOYEES IN INDUSTRY
-for individual and industrial development-

NO RISK in the IT environment

CLIENT

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STEERING GROUP

Chairperson Barbro Sundqvist, SIF

Project Leader Runo Carlsson, SIF

Project Co-ordinator Bruno Hagi, SIF

Project Co-ordinator Kåre Grebäck, SIF

Project Co-ordinator Tommy Nilsson, SIF FA 05

PROJECT GROUP

Project Leader Runo Carlsson, SIF

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Industrial Development, Gunnar Fond, SIF

Assistant Professor Marianne Dalene, University of Lund

Assistant Professor Gunnar Skarping, University of Lund

Medicine, Olle Johansson, the Experimental Dermatology Unit,
Department of Neuroscience, Karolinska Institute, Stockholm

Physics, Martin Andersson, Libere

Chemistry, Åke Bergman, Wallenberg Laboratories

Project strategy, Per Erik Boivie, Boivie Workplace Development

Information/Training, Ingvar Tätström, Informgruppen

Text: Ingvar Tätström

Illustrations: Nils Peterson

Project Manager/DTP: Joanna Thunholm

Editor: Ingrid Kopra

Researcher: Leif Tage Jansson

English translation: Peter Langsdale

Production: INFORMGRUPPEN AB

The IT society is creating new and serious risks to health

Completely new health problems have surfaced at our workplaces. Information Technology (IT) and the vast proliferation of electrical equipment that it has brought into our daily working life has created a new risk environment. Much of this has not been investigated, and the possible consequences to our health cannot be ignored. These invisible risks – often in the form of chemical efflux and physical radiation, under a common heading of ‘emissions’ – are at the centre of a project initiated by SIF – NO RISK in the IT environment*.

* The term “NOLL RISK” appearing in some of the illustrations is of course Swedish, and refers to the “NO RISK” concept, fully described in the text of this and other documents, that originated in Sweden.

THE NEWEST RISKS ARE USUALLY INVISIBLE

Invisible physical and chemical pollution, and a general lack of knowledge, mean that many people are probably risking their health at work without even being aware of it. Since we seldom know a lot ourselves about the sources of these risks, we don’t stand much chance of eliminating them, either.

This document is meant to focus attention on an important new problem in the work environment. Fear should be cured by knowledge, followed by measures put in place to reduce the risks as much as possible.

STRAIN INJURIES ARE INCREASING

Seventy per cent of all reported occupational injuries, including those in the IT world, are due to strain. Stress is one of the most important factors in this

connection. Many employees consider a high work tempo, allied to old-fashioned and outmoded organisation, to be a fundamental cause. Aching neck and shoulder muscles are common, as is tendonitis in the elbows or trapped nerves in the wrist. A major study by Arbetslivsinstitutet (The National Institute for Working Life) has shown that almost a million Swedes now suffer from so-called "mouse arm".

ALLERGIES HAVE BECOME ENDEMIC

People all over the world are worried about the effects of the apparently uncontrolled chemical pollution of the air, land and water. Without question, human health is being degraded by this. Fifty years ago allergies were unusual, but the number of those affected has dramatically increased. According to Folkhälsoinstitutet (The National Institute of Public Health), about 50% of the children in many Swedish urban areas suffer from allergies. Even if we don't know for certain what lies behind this increase, it is highly probable that environmental pollution, together with factors such as altered nutrition patterns, are important risk factors.

1889

"No office or manual worker shall have to go to a workplace where their health is at risk"

**Legislation concerning protection against occupational hazards.
Swedish Statute Book 1889**

THE AIM OF THE NO RISK PROJECT

By means of its NO RISK project, SIF wants to make a contribution to the creation of IT workplaces and practices that are free from health risks. Achieving this goal requires increased attention to invisible and usually unknown risk environments. A factual debate concerning the problem is needed. It is also necessary for scientists to want to work in this, often very complex, substance area, so that health risks can be eliminated. A preliminary partial goal in the NO RISK project is therefore to build up an international knowledge network of researchers and experts, and to stimulate these in the development of new methods of risk assessment. This work can be supported by the immense amount of user experience embodied in such groups as SIF members. If manufacturers acquire more knowledge concerning the needs of users, and if the users' knowledge of technology increases, this will benefit those manufacturers who are prepared to invest in products that are adapted to suit both mankind and Nature. What is good for employees in general is also good for the environment, for industrial development and thereby beneficial to the whole of society.

1998

"No-one shall need to risk his or her health as a result of deficiencies in the working environment or of hazardous working equipment"

**NO RISK
SIF
1998**

New technology provides new possibilities but also new problems

IT is a new work environment, which thus leads to new problems and new health risks.

"Sweden is probably the most computerised country in the world - despite its great advantages, the new technology has already created serious risks to health, both for people and the environment"

Quotation from a TCO folder concerning environmental labelling of computers

TCO, Tjänstemännens Centralorganisation - (The Swedish Confederation of Professional Employees)

Computers are necessary items in an efficient society. However, with its arrival, technology has set its own conditions. When designing the equipment and developing the new working procedures that accompany information technology, manufacturers have not sufficiently taken into account the risks to which users can be exposed.

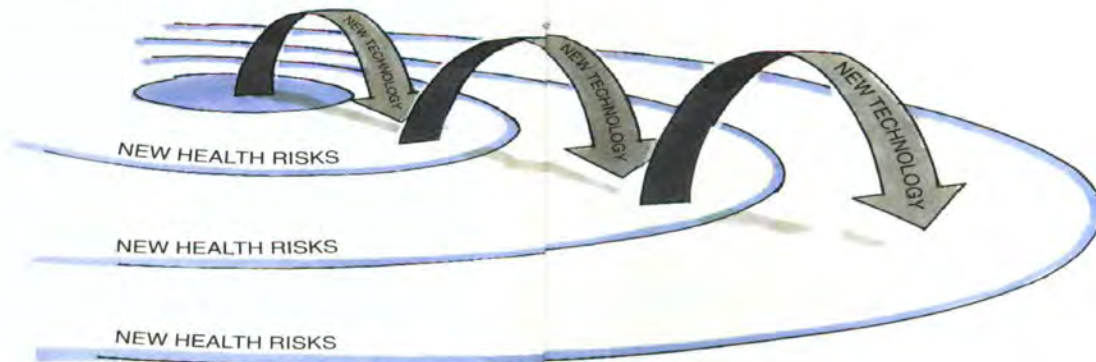
This year (1999), about a million new computer displays and computers will be sold. During its useful life, this equipment will affect at least as many users. Eventually all these computers will be scrapped, or to some extent recycled, depending on how environmentally-conscious the manufac-

turer has been. At the present time, electronics scrap is a considerable and important risk factor, that is very likely to have a negative effect on both humans and the external environment for a very long time to come.

Differences in opinion between scientists and experts whose work involves assessing environmentally-related health risks have created a climate of uncertainty among users, manufacturers and authorities. The greatest problem in this debate is the large measure of uncertainty that exists among the corpus of "expertise" within medicine, chemistry and physics concerning the degree of risk to health that can be related to the IT environment.

As an example, the problem of electrical hypersensitivity has split the experts into separate camps, where the arguments of one group do not appear to have any effect on the other.

International developments are now increasingly confirming the validity of the SIF approach, which is that the precautionary principle should be retained until more knowledge has been gained about the true risks attached to IT. More and more people are now expressing their great respect for the work that SIF has put into the question of electrical hypersensitivity. SIF is now going further, with the NO RISK project in the IT environment, which is thereby timely.



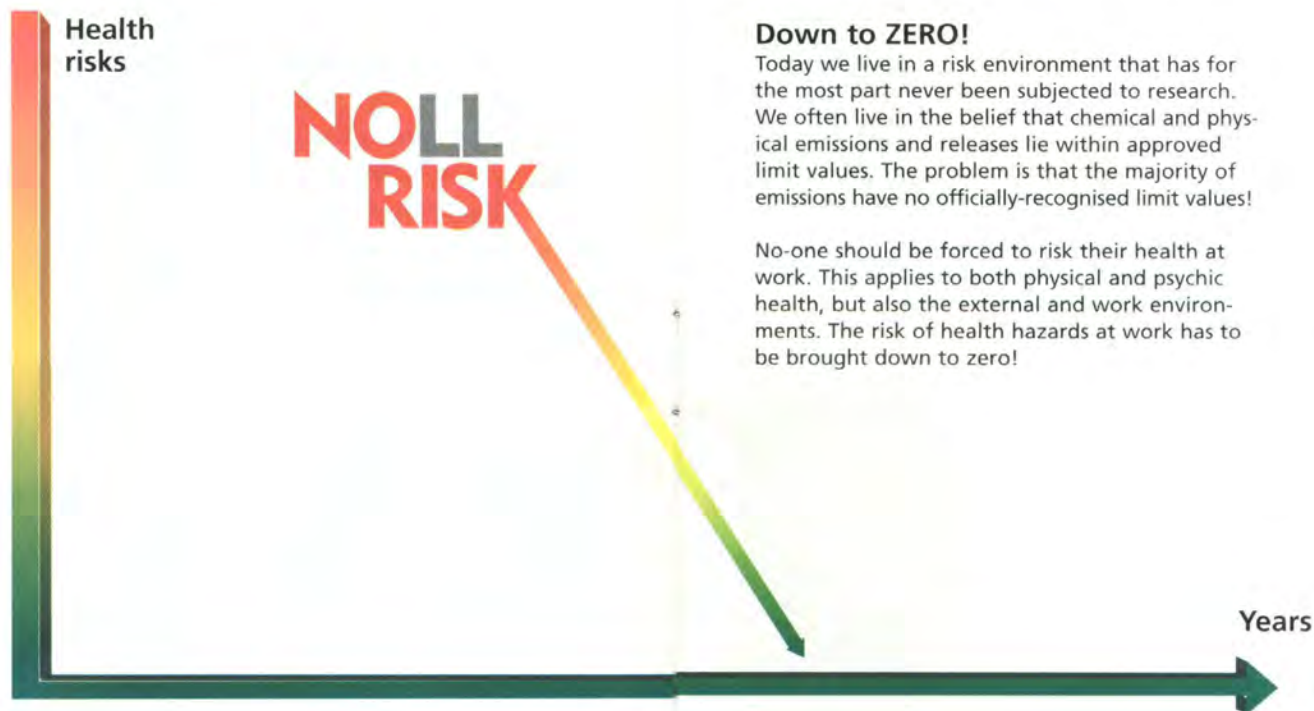
What does NO RISK mean in the IT environment?

The goal of NO RISK in the IT environment is to free our working environment from health risks - no risk to employees! It also stands for respect for the external environment. A healthy external environment is an important prerequisite for everyone's well-being.

The project also aims to increase users' knowledge, to provide support in the creation of risk-free workplaces, and to help to secure a choice of environmentally-adapted equipment. In addition, it wants to support the manufacturers of IT equip-

ment by co-ordinating such knowledge as currently exists, and initiating new knowledge to support the development of new and user-friendly technology, so-called Human Technology.

NO RISK in the IT environment concerns the work environment, but its consequences also include the external environment. It is no longer possible to separate the two, since what is bad for humans is naturally harmful to Nature, and vice versa. In Sweden, the Hallandsås environmental catastrophe has clearly proved this. Using the substance known as RochaGil without first carrying out a thorough risk analysis revealed disturbing deficiencies from both a work and natural environment point of view!



Down to ZERO!

Today we live in a risk environment that has for the most part never been subjected to research. We often live in the belief that chemical and physical emissions and releases lie within approved limit values. The problem is that the majority of emissions have no officially-recognised limit values!

No-one should be forced to risk their health at work. This applies to both physical and psychic health, but also the external and work environments. The risk of health hazards at work has to be brought down to zero!

Why is NO RISK needed in the IT environment?

The amount of electrical equipment in our workplaces has increased dramatically. We are usually surrounded by a "forest" of electrically-powered apparatus and lights, with the cabling underfoot often resembling a snake pit.

The concept of emissions is, in this context, very important. It stands for the release of tiny particles, the efflux of chemical substances into the air and the presence of electrical and magnetic fields surrounding electrically-powered equipment and electric cables.

Most of the emissions in today's work environment are invisible. They can consist, for example, of decomposition substances derived from plastic, such as flame retardants and solvents, or isocyanates that are released from computers or other electrical equipment, and which are absorbed by humans via airways and skin. They can also be electromagnetic fields that are feared to cause electrical hypersensitivity.

Another type of emission is the heat that all electrical equipment develops, and which in turn reduces air quality, thereby affecting our health. Tackling these known and suspected health risks is what the NO RISK project is designed to do in its first phase.



Radiating equipment!

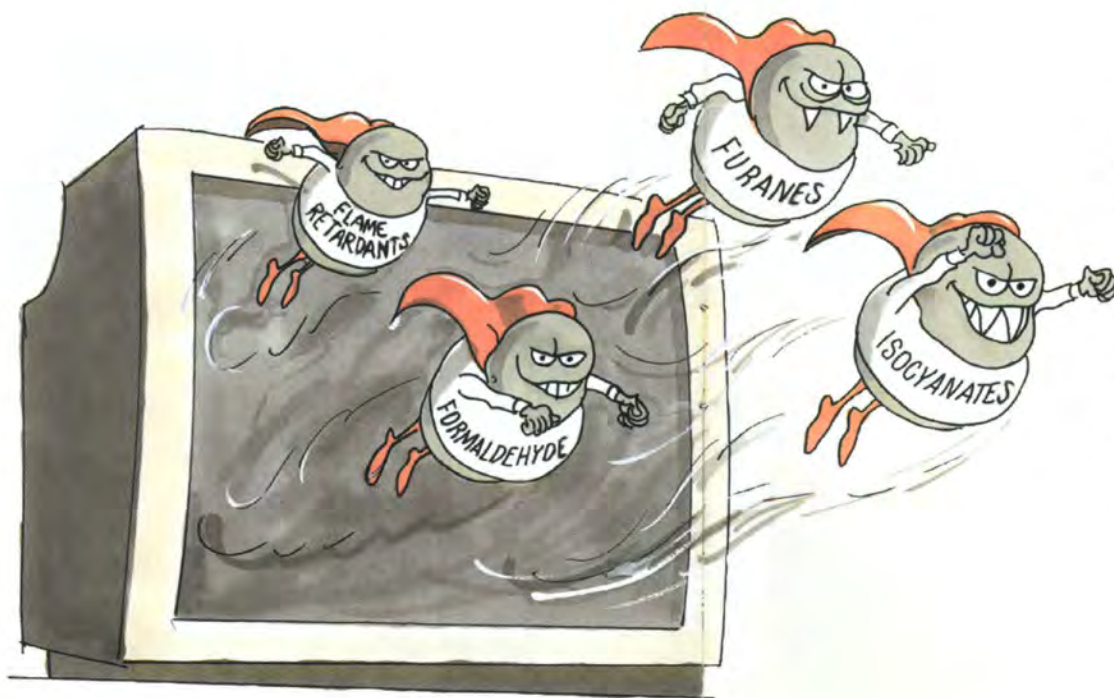
We are often surrounded by electrically-powered equipment which is producing a great deal of unnecessary radiation, e.g. electromagnetic fields, heat, chemicals, etc.

It's the invisible health risks that are causing problems nowadays!

How will the emissions that I am being exposed to today affect my health in a year's time – or five or ten years from now? This is to do with risks that most often can't be seen, and that we have precious little knowledge about. Few of us normal users have ever heard of chemicals with names such as isocyanates, furanes, formaldehyde or polybrominated diphenyl ethers, even though these are substances at present commonly found in our workplaces.

But even the experts don't know enough about how such chemicals can affect the human organism. The NO RISK project supports the accumulation of knowledge concerning the effects of these substances on Nature and on our health. SIF embraces the precautionary principle, whereby great care is taken when using products or substances if there is the slightest hint of a possible negative influence on humans and the environment.

The principle of "reversed proof" will undoubtedly be applied in the future to the use of new substances. This means that the manufacturers will have to prove that substances are not harmful before they can be used.



Free emissions

All sorts of chemicals are released into the air from the wide range of electrical equipment, such as computer displays, that we have in our offices. We know that some of these are harmful to health, whilst there are others we just don't know enough about. One thing we are sure of, however, is they have not been analysed sufficiently from the viewpoint of health, and are therefore undesirable!

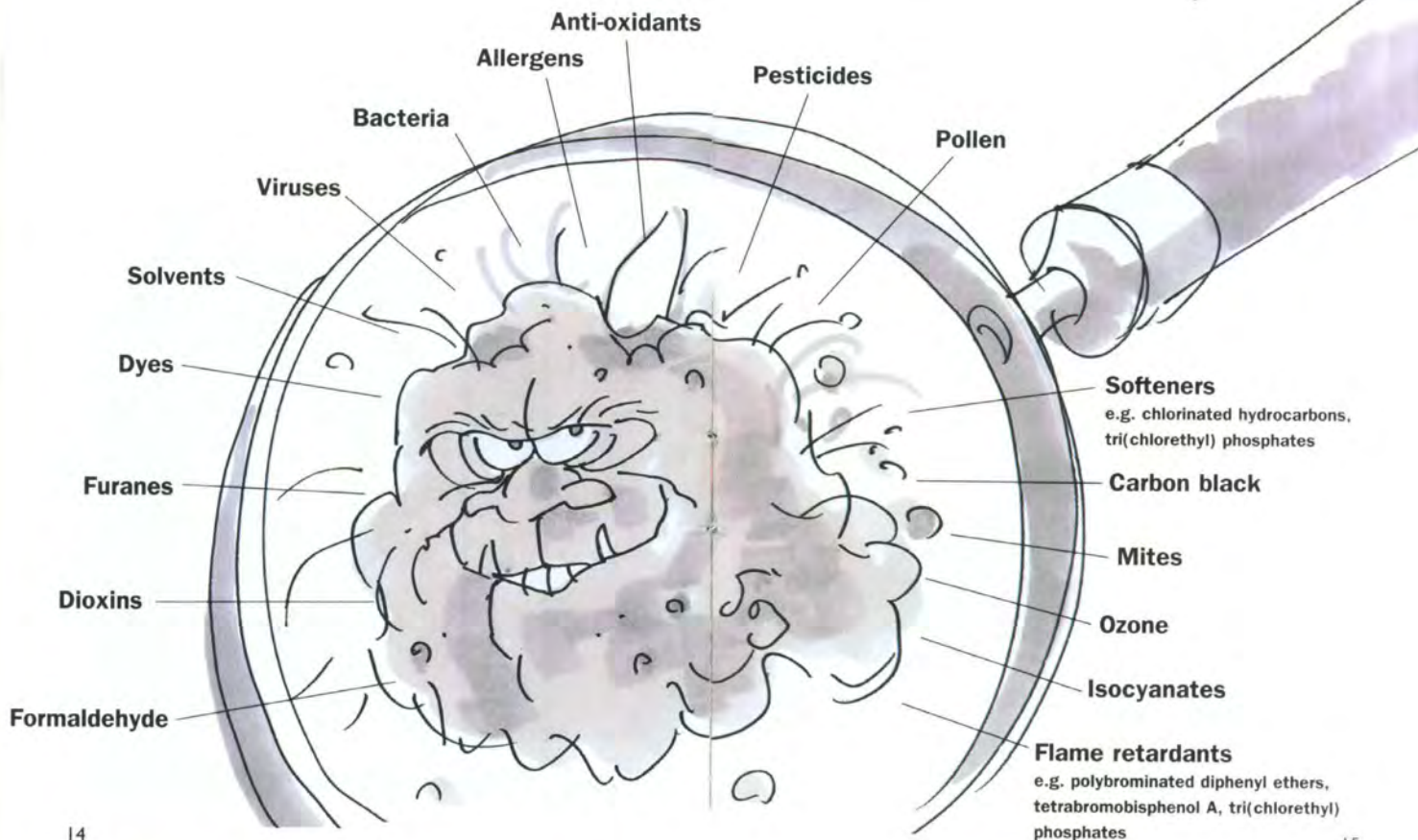
An electrostatically-charged speck of dust can contain all this

The amount of chemical substances being released from such electrical equipment as computer displays is rapidly increasing, and yet there is still insufficient knowledge concerning their effects. At the Karolinska Institute in Stockholm the levels of brominated flame retardants found in breast-feeding milk have been studied. (These substances are related to PCB, which is known to be harmful). Since 1972, when the levels were so

low that they could scarcely be measured, dramatic annual increases have been noted. People are absorbing these substances and particles partly through respiration and partly via food.

All the substances in the picture below have been found in the air we breathe. Our knowledge of their effects on the human body is quite limited, so we should try to minimise the use of these substances as far as possible.

It is difficult, and may even be impossible, to determine the limits of how much the body can tolerate before the effects pose a risk to health. We know that reactions within the body are highly individual. The entire range of these chemicals in the office environment should undoubtedly be restricted and minimised wherever possible.



Today's electrical power supply units generate high frequencies which increase the risks

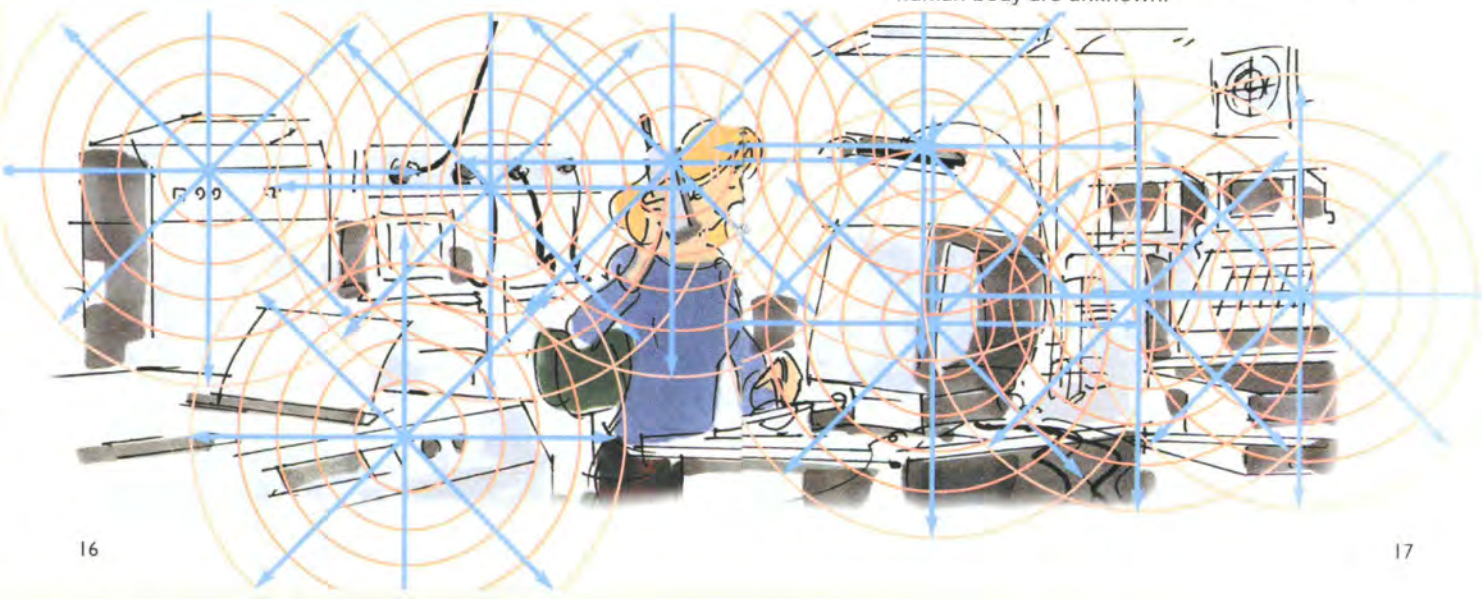
Never before in the whole of history has mankind been faced with so much exposure to electromagnetic fields as now. Today we are surrounded by electrical apparatus, all generating these fields. Sleeping next to a clock radio exposes you to just as powerful an electromagnetic field as if you were standing underneath a high tension power cable.

The electromagnetic fields generated by different devices affect each other, and their interaction can give rise to field modulations of a completely new character. The overall effects of these interacting electromagnetic disturbances have not been investigated scientifically, but some researchers think that unbalanced currents evoked in this way can have a very adverse effect

on the human organism, although others believe that the radiation is completely harmless. One thing is however certain – these electromagnetic fields affect us all, even if we don't yet know exactly how. The electromagnetic radiation that surrounds electrically-powered equipment is a polluting influence on the environment that is often completely unnecessary! In most cases it is possible to efficiently screen the equipment or move it to a separate room.

One problem that has newly been discovered is that some electrical components, such as transformers and voltage converters for certain types of lighting and other devices, distort and “chop up” the electric current they produce into short-period pulses, with harmonics at frequencies above the basic frequency of the mains power supply. These brief pulses are accused by many of being a major health risk, not least for people who are suffering already from electrical hypersensitivity.

The electromagnetic fields generated by the amount of electrical equipment present in today's offices interact with each other and often give rise to electrical disturbances, the effects of which on the human body are unknown.

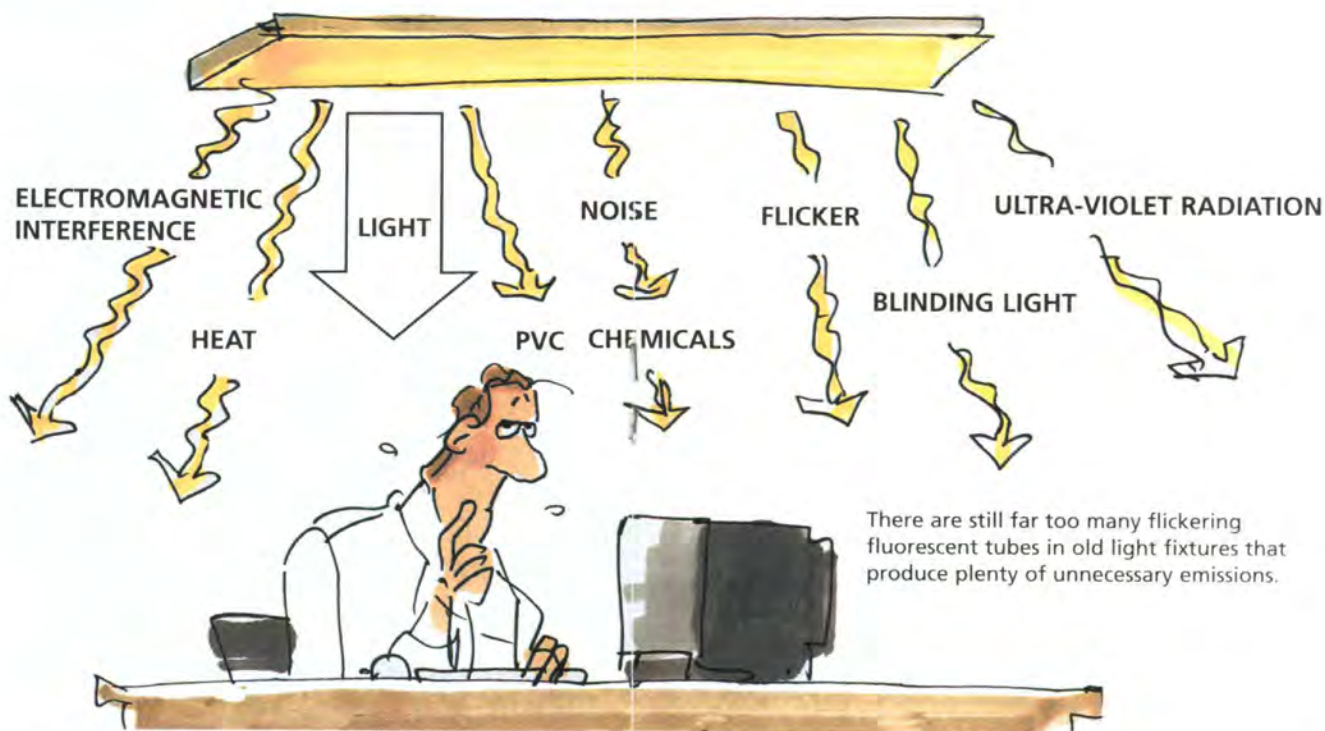


Our most commonly used strip lighting gives out large amounts of unnecessary emissions and radiation

The job of a lamp is to produce light - which is a kind of desirable emission. However, the fluorescent tubes and power-saving lamps we use today also produce a great deal of unnecessary emissions, with what we can call undesired side-effects. The technology of a fluorescent tube is old, but even if such lamps can be considered as energy-saving in comparison to the usual filament bulbs, a conventional fluorescent tube is actually

environmentally harmful. It contains mercury, and must therefore not be thrown in the dustbin, but instead handed in for correctly handled disposal. The picture below shows some examples of the side-effects from a perfectly ordinary fluorescent tube, that can pose hazards and are in the main completely unnecessary.

It used to be that environmental requirements imposed from outside, which meant changes in product design, were resisted by manufacturers on the grounds that it added cost and thereby lowered competitiveness. Now a new trend is beginning to appear. Product improvements based on concern for the environment are increasing their attractiveness on the market, at the same time giving savings to manufacturers and in fact increasing competitiveness.

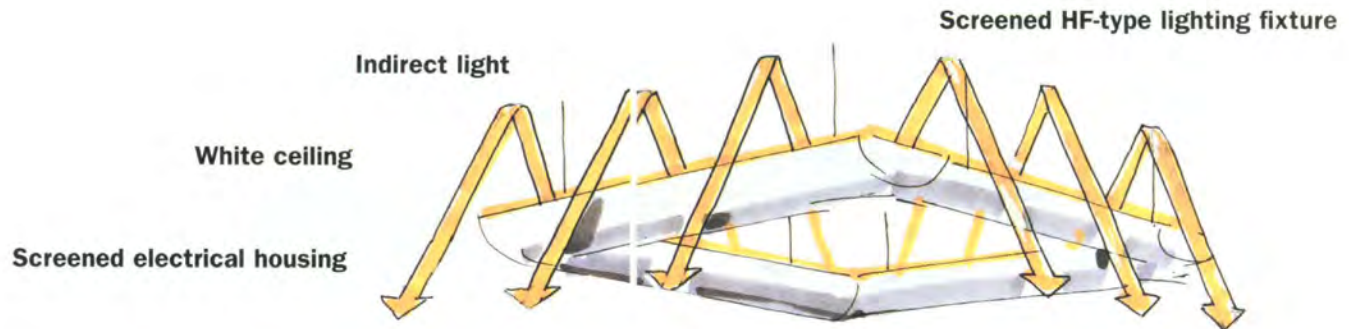


Good equipment is already on the way to presenting a NO RISK environment

The route to NO RISK in the IT environment does not necessarily have to be long and difficult. We already have a number of products that are well on the way to NO RISK. There are many lighting units that are flicker-free, and high frequency-

screened, which means that the tube itself is driven at a very high frequency, of about 30 000 Hz, instead of the more usual 50 Hz of the mains. This eliminates flicker without the tube heating up. It also comes on immediately when switched on, without flashing on and off first.

In most working conditions it is best for most of the light to be directed upwards so that it reflects off the ceiling. If necessary this can be complemented by single-point lighting aimed straight on to the working area.



New lighting technology has led to a great deal of improvement in respect of both general and single-point lighting. Flicker-free lamps with screened fixtures can provide an extremely good lighting environment.

Screened IT equipment



How dangerous are our mobile and cordless telephones?

The truth is that no-one knows exactly how dangerous the radiation from these telephones is. Australia has recently introduced limit values for mobile phones that are much stricter than their equivalents in Sweden. Does this mean that the Australians know more about the risks associated with mobile phones than we in Sweden do? No, the degree of knowledge is about the same, but they have a much higher level of risk consciousness, since they are more exposed to the effects of human activities on the environment. The connection between skin cancer (or malignant melanoma) and increased ultraviolet radiation (Australia has been hit hard by the ozone hole)

has led to increased watchfulness by the authorities. The debate on mobile phones has also raged more fiercely in Australia, where one body of opinion wants the precautionary principle to apply until more is known about the possible risks.

Radiation from mobile telephones also affects other electronic equipment, such as aircraft and hospitals; it can penetrate thick walls and into the human body.

There is now an increasing use in offices of internal telephony networks, using cordless DECT (Digital Enhanced Cordless Telephones), which as a rule are used more often and for longer conversations than mobile telephones. There is no knowledge about health risks from these, either.

The scientists cannot even agree. Those limit values that exist have been set only on the basis of the thermal effects (heat radiation). Insufficient investigation has been made into any health threats from non-thermal effects that may be present.



The DECT type of internal telephone system uses a network of radio base stations. Radio frequency fields are only generated when the telephone is in use. Unlike conventional mobile telephones, the DECT has no power control, and therefore these telephones always operate at maximum power. DECT systems also use higher frequencies than mobile phones. SIF recommends that everyone who uses DECT in their work should have hands-free equipment, so that they can use a separate earphone and microphone.

Stress often lies behind the most common reasons for sickness absence

About 70% of all occupational injuries are related to strain problems. This is a clear sign that the human body is often over-stretched, and one of the reasons for this is the stress imposed by working life.

What are the limits of our capabilities? We don't know. We think that we are the best judges of when we have reached our limits, but by that time it's usually too late.

Current research has discovered that stress weakens our immune system. Everybody knows what it's like to catch a cold just when stress is at its highest. The extent of this influence on the human immune system is not known, but many

sufferers of electrical hypersensitivity and allergies have been found to have reduced levels of immunity. The principle of "the straw that broke the camel's back" is quite likely to apply to many of the oversensitive reactions in our bodies.

More and more experts now define stress as the largest health problem of our time. "A time bomb", say representatives of both the Health and Safety at Work and National Insurance organs. We already know that stress is a contributory factor to heart and coronary illnesses, high blood pressure, strain injuries and psycho-social problems.

Stress is not just an automatic response to having a lot to do. Stress is built up of many factors, where inadequacy, lack of control of the work situation and deficient job satisfaction and enjoyment are important elements. In this way, even stress is but one example of the invisible health problems that often only become visible once the damage has already been done.

Positive stress is a natural protective behaviour that sharpens our senses and reinforces our inner resources. It stimulates the body and prepares us to increase our capabilities – for a limited period.



Negative stress is oppressive and destroys both job satisfaction and life's enjoyment. Stress really has little to do with how fast we have to work. Stress is brought about by what we don't manage to get done, all the things we ought to be doing, and it's our own bad consciences that are eating us away inside!

Is NO RISK possible or just plain ridiculous?

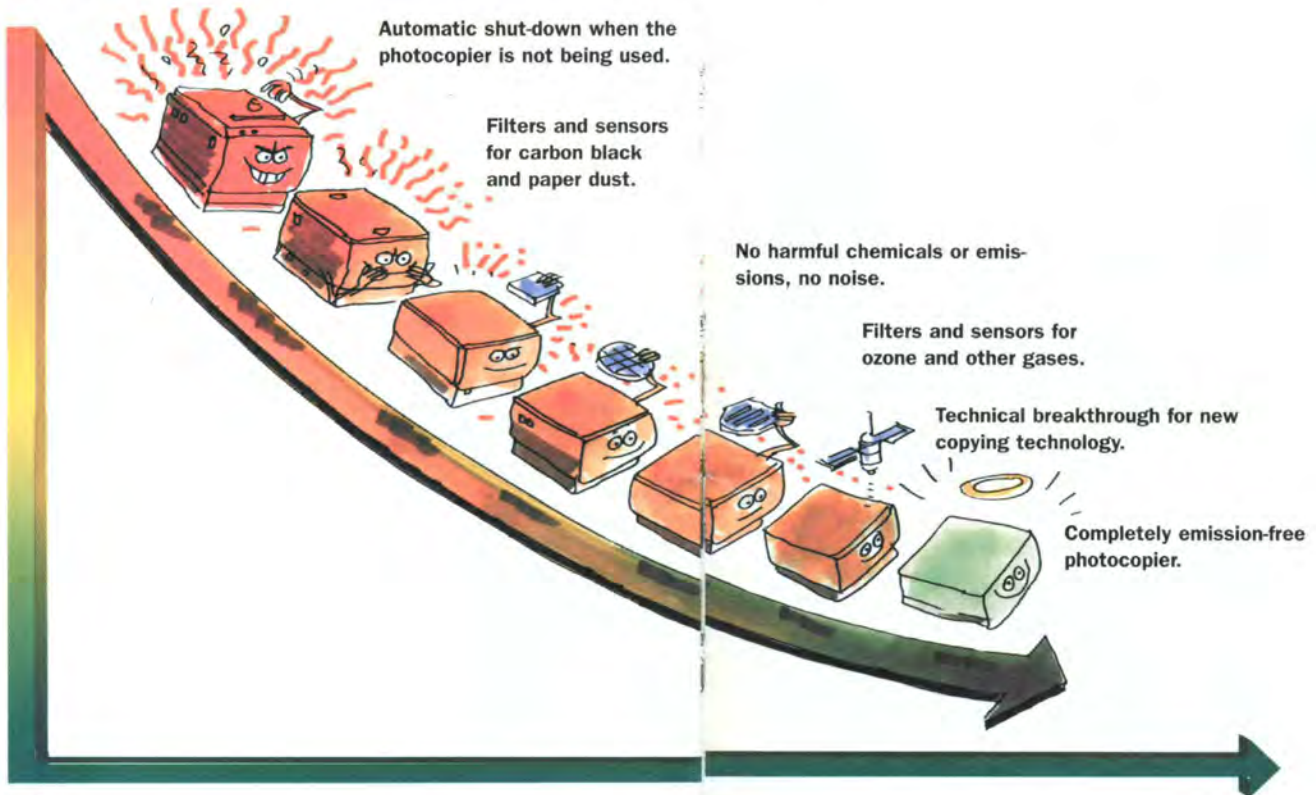
"You could never take all the risks out of the work environment – NO RISK is just not attainable", many probably think after looking at SIF's vision. But many experts said just the same thing about removing chlorine from paper manufacture, freon from refrigerators and the harmful solvents in paint, putty and glue – impossible! That was the accepted view. Today we know better.

It has to begin with customer demand, an opinion that has a direct effect on the market. Then an alternative appears. And alternatives do exist!

Laser printers are for example often equipped with ozone filters. Such filters need to be changed after just a couple of months use, but there is no requirement or even recommendation to do this.

There are already well-known techniques that can be used to eliminate a whole group of unnecessary emissions from printers and photocopiers, that include screens, sensors and filters. If we users get to know more about the subject we can also set demands when negotiating, and thereby apply pressure to bring about new and more user-adapted technology.

NO RISK has here one of its most important tasks, with the aid of knowledge accumulation and co-operation with scientists and manufacturers, helping users to set high environmental demands when purchasing new equipment.



High environmental demands favour exports

Demands concerning both the external and working environments stiffen competition and at the same time open new possibilities for companies to broaden their markets. Those who are investing in environmentally-adapted products right now have realised that it doesn't pay to "wait and see" if they want to take their place and compete for environmentally-conscious customers in the international marketplace. In societies that strive for long-term sustainable development it's only a matter of time before environmental demands exclude products that affect people and the environment in a negative sense.

Severe environmental demands give Swedish forestry companies a competitive advantage

"When our forestry industry embarked on environmental labelling, a lot of people complained of the risk of reduced profits. But when I met my European colleagues, many were very upset when they realised that it was such a great competitive advantage to the Swedish forestry industry that it would cause other countries problems."

Anna Lindh, Dagens Nyheter
(Swedish daily newspaper) May 11, 1998

Environmental demands are at present coming from two directions; from consumers, where a new sense of environmental awareness has grown up, and from companies who are demanding of their suppliers that they should have environmental management systems, and that their products must meet modern environmental and quality requirements.

Many companies are now changing their strategy. Instead of waiting for limit values or directives from the authorities, they are being proactive in meeting the increasing demand for environmentally-adapted products.

* The quotation below mentions brominated flame retardants (BFR), which consist of many different substances. Some are very dangerous to health and their use should therefore be forbidden immediately, while it is not clear yet how harmful others are.

The Swedish government is taking an important step towards the NO RISK project

"The Swedish government proposes that the entire group of chemicals that is suspected of damaging life shall be forbidden. As an example they name the brominated flame retardants that are used in furniture and computers."*

To wait until research has fully explored these substances might take a century. We can't wait that long."

Anna Lindh, Dagens Nyheter
(Swedish daily newspaper) May 11, 1998

It's a matter of prevention, prevention and even more prevention!

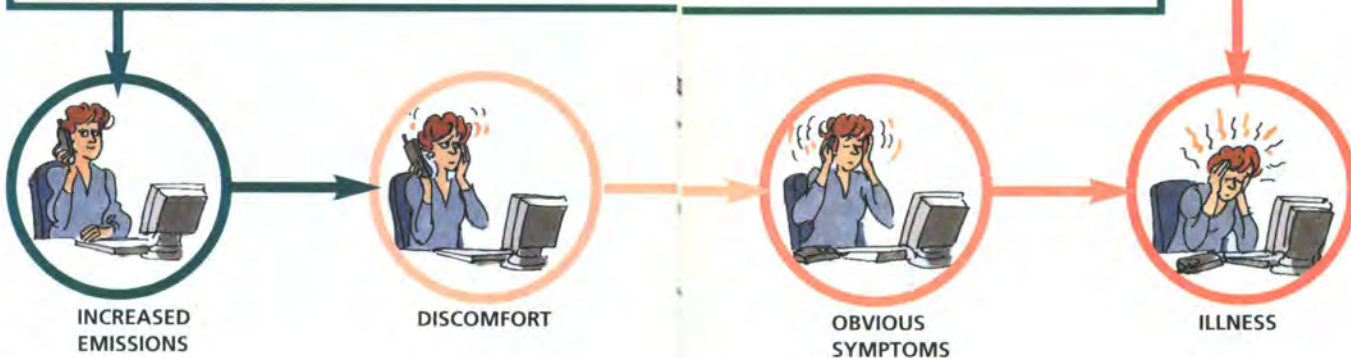
People who suffer from electrical hypersensitivity have, apart from the physical discomfort, almost always had also to put up with a distinct lack of sympathy and understanding from others. The difficulty this brings to recounting their problems causes many to keep quiet about the problem and try to suppress it. Once the damage has been done it is almost impossible to turn the clock back. The sensitivity increases, and regardless of

what changes may be made in the work environment, the problem tends to become chronic. Even if everything that can be done is done for those who are already suffering, preventive measures are the ones that can solve the problem. A lot of competence now exists in respect of planning electrically sanitised workplaces to radically minimise the risk of being afflicted. The same must be done in the case of ridding our workplaces of airborne risk-filled substances.

NO RISK in the work environment is best created by preventive measures based on true knowledge of the problems and an overview of people and the environment. Until this knowledge becomes available, the precautionary principle must apply.

At present we only try to solve problems **after** they have arisen
= a method for those who are already ill

With the NO RISK project, ill health shall **never be permitted to occur** = one method for all

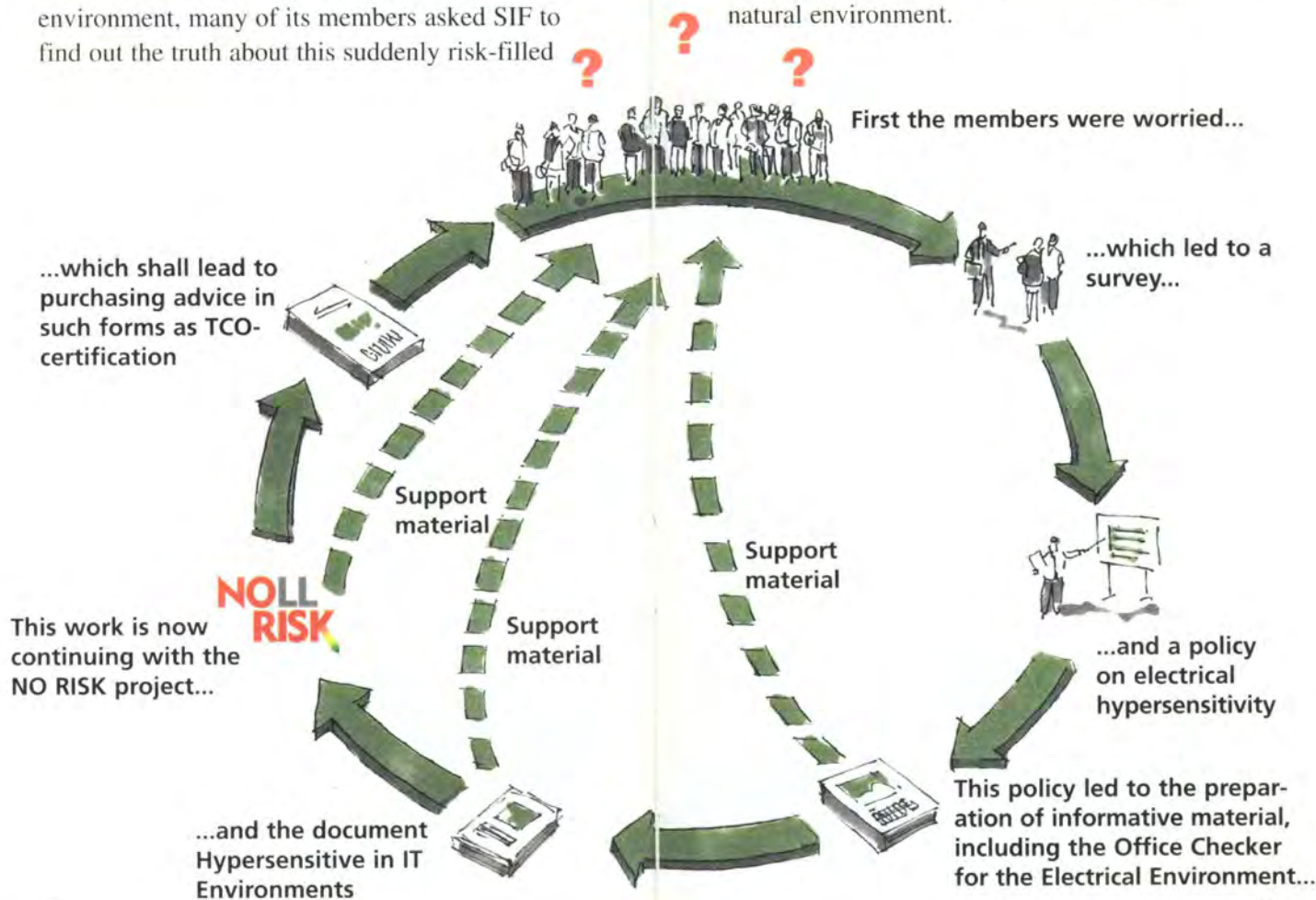


The needs of our members started the build-up of knowledge and gave birth to the idea of NO RISK in the IT environment

When the general public first became aware of the alarming reports that linked electrical hypersensitivity to electromagnetic fields in the IT environment, many of its members asked SIF to find out the truth about this suddenly risk-filled

environment. SIF then carried out a survey among its members and initiated co-operation with experts to investigate whether the concern was justified. As the amount of knowledge in this area grew, the members were kept informed, and received support in avoiding the phenomenon of electrical hypersensitivity.

It is hoped that the NO RISK project shall lead to purchasing advice whereby SIF will be able to recommend suitable environmentally-labelled products, in turn leading to a reduction of the risk levels in the work environment and a simultaneous fall in the load imposed on the natural environment.



The NO RISK project paves the way to ensuring that obvious health risks shall not be present in the future office environment

Continuous research and development is going on among office equipment manufacturers and within the IT industry, and this has already led to a long list of products that ease office work. However, as this brochure shows, new risk environments have been created. Hence it is necessary for the users'



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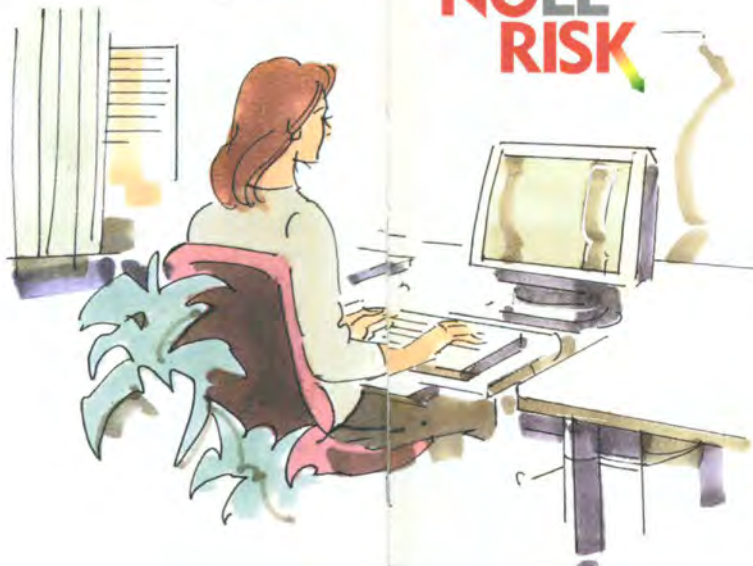
Mobile telephone



Lighting



Telefax

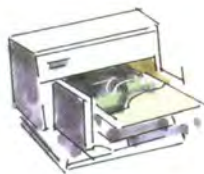


**NO
RISK**

knowledge, real need for good equipment and demands for a risk-free work environment to reach the manufacturers. This influence would probably be most effective if industry could take into account the user expertise embodied in such groups as the SIF membership.

Users can also exercise their freedom of choice by only purchasing products that meet high level environmental requirements. Such "consumer power" has proved to be very effective within other product areas.

When the market offers NO RISK products SIF will have achieved its aim, to improve the work environment for employees, while reducing the burden upon Nature.



Printer



Furniture



Portable computer



Cabling and wiring

An important SIF initiative

We live in an age that challenges the capability of SIF to think in new ways within many areas.

Globalisation of the economy and rapid IT development have radically changed the conditions in which we work.

The NO RISK project devised by SIF for the IT environment is one example of new thinking, a completely new model for applying trade union influence to development by using the "consumer power" of the members. Only products and equipment that can meet tight environmental requirements shall be considered when negotiating, with a view to improving the working environment for the employees, while reducing Nature's burden.

This document has perhaps made you stop and think, in which case it has succeeded in its purpose. If, on the other hand, you feel worried, and perhaps powerless, the text has missed its mark.

Worry doesn't solve anything, it's only through knowledge and practical measures that the working environment can be improved. If you would like to know more, please contact your local chapter.

Do you want to join in?

Do you want to join in and contribute your ideas and expertise to this project? Which new products and aids would you like to see in the workplace?

Become a part of the SIF knowledge network!

Let your local chapter know, or state your views and ventilate your opinions on the SIF home page at www.sif.se/cafesif (then choose SIF-miljö 99).



SWEDISH UNION OF CLERICAL AND TECHNICAL EMPLOYEES IN INDUSTRY

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APPENDIX B

NEWSletter

NUMBER 1

1999

TRUTH & CONSEQUENCE



The past few decades have been a time of opportunities. Technological development has completely changed conditions for how we humans live, work and communicate. Still, we have only begun to scrape the surface of possibilities.

AT THE SAME TIME, NEW TECHNOLOGY AND NEW MATERIALS GIVE RISE TO IMPORTANT QUESTIONS ABOUT WORKING ENVIRONMENTS AND OUR HEALTH. CONCERN ABOUT ELECTROMAGNETIC RADIATION AND CHEMICAL EMISSIONS GROWS ALL THE MORE. SCARY SCENARIOS ARE MIXED WITH "CALMING" REPORTS. IT BECOMES MORE AND MORE DIFFICULT TO DECIPHER BETWEEN TRUTH AND SPECULATION.

ABOUT/CONTACT

The Healthy Office project aims at informing and educating others in questions concerning modern electrical environments and office environments. Our main aim is partly to eliminate/reduce chemical emissions from materials that are used in offices, and partly to reduce/eliminate radiation from electrical apparatus in such environments.

The project is backed-up by a whole spectrum of interested parties, from national organizations to local companies. Swedish and international researchers, each leading experts in their respective fields, are also tied to this project.

The aim of the project is to unify a number of less concrete projects with the mass of knowledge existing among researchers. Such projects include ideas that are based on a knowledge of electromagnetic fields and how to minimize adverse effects on people exposed to these; classrooms and offices that have been sanitized from electricity giving us the practical opportunity of testing solutions that can give a better working environment; and more effective measuring techniques for frequencies of 50 Hz or more in cases where we have reason to suspect an adverse effect on biological systems.

FOCUS ON THE ENVIRONMENT



A Word from the Project Leader

During the first and second quarters of the year a great effort has been made to find suitable partners for cooperating with us on this project. Through our contacts with the Swedish Union of Clerical and Technical Employees in Industry (SIF) and its project "Noll Risk i IT miljö" (No Risk in IT Environments), there is now greater scope for the projects than planned.

Also, competent support via researchers at Luleå University of Technology has been extremely helpful. By aiming our resources at modern electrical environments and making this clear to presumptive interested parties, the need of education and information has increased via this organization. Public debates about emissions and different health risks in the home environment and in public environments has given rise to more and more people recognizing the need of competency in this sphere. Guidelines from Boverket also show the need for taking measures and for the technical reduction of electric and magnetic fields within public organizations. Increased international interest in interior environments and products adapted for a pleasant and safe environment also opens up the market for more services in the above areas. In this regard, the project has made use of previous international experience gained by the Umeå School of Economics. And these studies continue. Empirically, the need of a knowledge of domestic engineering that takes health effects into consideration has lead to discussions outside our region and has resulted in a good dissemination of competence to national interests.

Lars Tornberg
Project Leader
The Healthy Office

THE HEALTHY OFFICE
PROJECT FOCUSES ON
IMPORTANT PARTS OF THE
ENVIRONMENT IN OUR
OFFICES THAT HAVE SEEN
GREAT CHANGES SINCE
THE INTRODUCTION OF
TOOLS CONNECTED TO
IT-TECHNOLOGY.

In recent years new health problems have arisen at our places of work, and the connection between new technology, new building materials, increased emissions of electromagnetic radiation and chemical substances seem to be one of the reasons for some of these.

As the distance between work and leisure diminishes, many workers equip their homes with the same kind of technological equipment that they have at work.

The need of gathering information and conveying it to companies, municipalities and organizations has given rise to this project.

In cooperation with Luleå University of Technology (LTU) and the Swedish Union of Clerical and Technical Employees in Industry (SIF), among others, existing knowledge on this subject will be presented at seminars and training courses. This project has also given rise to side projects that aim at improving measuring techniques of electromagnetic fields and reducing chemical emissions from furniture in public environments. This assignment has gone to LTU's department in Skellefteå.

At my previous job with Liberel AB, I was responsible for developing technical solutions for companies with a lot of technical equipment. Office desks at a number of companies connected to the Stock Exchange in Stockholm contain some of The Healthy Office concepts with regards to electromagnetic radiation and chemical emissions.

With the wide scope of experience that exists in The Healthy Office project's reference group, it is possible to reduce or eliminate the risks of chemical emissions and electromagnetic radiation in today's IT-based activities.

Martin Andersson, AMA-Konsult AB in Skellefteå

e-mail: ama-konsult@telia.com

NEWS LETTER

THE DEPARTMENT IN SKELLEFTEÅ is one of Luleå University of Technology's 14 institutes. We put a lot of emphasis on wood research, but also have an interdisciplinary combination of higher education courses and embryos regarding research work in the spheres of computer technology, electric power and electric environments. The Institute has joined The Healthy Office project because of our competency in several of the related areas and because we believe that there is a strong potential for developing education, research and enterprise within this sphere of activities. Our proficiency in the sphere of wood, including how to connect technological systems with biological variation using trial designs and multivariator models, has been an important basis for this. We are also uniquely competent in the sphere of practical EMC – that is to say, how electrical apparatus and other systems function together outside the controlled laboratory environment.

We live in a rapid and complex world. We introduce substances and electrical apparatus into our environment that affect our bodies in a way that we have very little knowledge of. The only basis we can have for judging the possible effects that such substances and electrical apparatus may have on our bodies is the possibility of measuring their magnitude in our environment. An absence of relevant measuring techniques means that we are unable to trace emissions in our environment to their sources or relate them to damaging effects. Today, it is possible to trace complex relations and to describe complex processes by means of soft multivariator models. There are existing advanced measuring techniques within different areas of research. The only problem is connecting these techniques to our knowledge of how biological systems function.

The Healthy Office project aims at connecting the mass of knowledge that exists among researchers with a number of small practical projects that are based on the concept of minimizing electromagnetic fields for people working in their vicinity. Classrooms and offices that have been cleaned from electrical fields give us the practical opportunity of testing solutions that can lead to better working environments. We are working on measuring techniques for measuring frequencies of 50 Hz and more, suspecting that these frequencies have an effect on biological systems.

As far as wood research at the Institute goes, we will be concentrating on developing a basis for wood products that fits The Healthy Office concept. These products will be adapted to the ecological cycle and give off lower

emissions in the environment. First, we will be working with homogenous wood, and secondly wood products, improving their qualities by means of a processing technique that includes drying and heat treatment. Thirdly, we will be working with composite materials based on natural raw materials with wood as the basic component.



One of the long-term goals for work at our Institute, connected to this project, is to establish a laboratory environment with a practical application in combination with relevant measuring techniques so that we can offer an educational programme dealing with electrical environments on a wide interdisciplinary basis.

The following partial projects within the EU project are being carried out today by the Institute in cooperation with companies close by:

The Instrument Pool. Co-financing and joint use of measuring instruments.

A Computer working place that is electrically sanitized. Practical studies of local and external sources of interference at an individual working place and how such interference is affected by different installations.

A classroom that is electrically sanitized. The construction one of the floors where the whole electric network is planned together with other networks for a better environment.

Computers. Testing screens and computer networks outside the laboratory environment.

Olle Hagman, Prefect of LTU's Institute in Skellefteå

ELECTRICAL SANITATION ACTIVITIES

PRACTICAL EXAMPLES OF ENVIRONMENTAL ADAPTABILITY WITH REGARDS TO ELECTRICAL SYSTEMS AND CHEMICAL EMISSIONS

ARBETSLIVSTJÄNSTER IN SKELLEFTEÅ
IS STUDYING HEALTH COMPLAINTS AND
HYPERSENSITIVITY RELATED TO THE
ENVIRONMENT VIA ELECTRICAL SANITA-
TION ACTIVITIES IN A PROPERTY IN THE
HOUSING AREA OF ANDERSTORP IN
SKELLEFTEÅ.

One of the aims of this property is to investigate the effects of an environment free of electricity on persons who have been stricken with so-called hypersensitivity to electricity.

Hypersensitivity to electricity is a growing problem. There are an unknown number of unrecorded cases of people who suffer from different symptoms at workplaces with electric/electronic apparatus and instruments or who spend time in environments surrounded by electricity. Researchers are not in agreement as to the reasons for these health complaints. However, the fact remains that there are a lot of people who are off work sick for long periods on account of this.

In their report on hypersensitivity to electricity, Arbetslivstjänster offer living quarters and occupational testing for a period suited to each individual in an electrically sanitized environment in this property in Skellefteå.

This property, which is the principal part of these activities has eight flats where measures have been taken to reduce electromagnetic fields and interference from electricity and telephone networks on the outside to a minimum.

A lot of consideration has been given to reducing exposure to chemical emissions of substances that are suspected of triggering off hypersensitive reactions. Computers and communications systems have been equipped with technique that reduces radiated and electric wire conducted interference from electric and magnetic fields. The lighting system and power distribution in the property are also carefully constructed to achieve a good electric environment.

During the past year test activities have been carried out and supplementary measures have been taken, and these electrical sanitation activities were inaugurated on 1 September 1999. Speakers at the inauguration were Mari-Ann Krantz, chairwoman of the Swedish Union of Clerical and Technical Employees in Industry, Olle Johansson, university lecturer on experimental dermatology at the Caroline Institute and Bert Öhlund, Chairman of the Board at Skellefteå Kraft.

We will be continuing work with The Healthy Office project in Skellefteå and applying the experiences we have already gained in this project on a greater scale.

Jan-Ivar Eriksson
Arbetslivstjänst AC



NEWSletter

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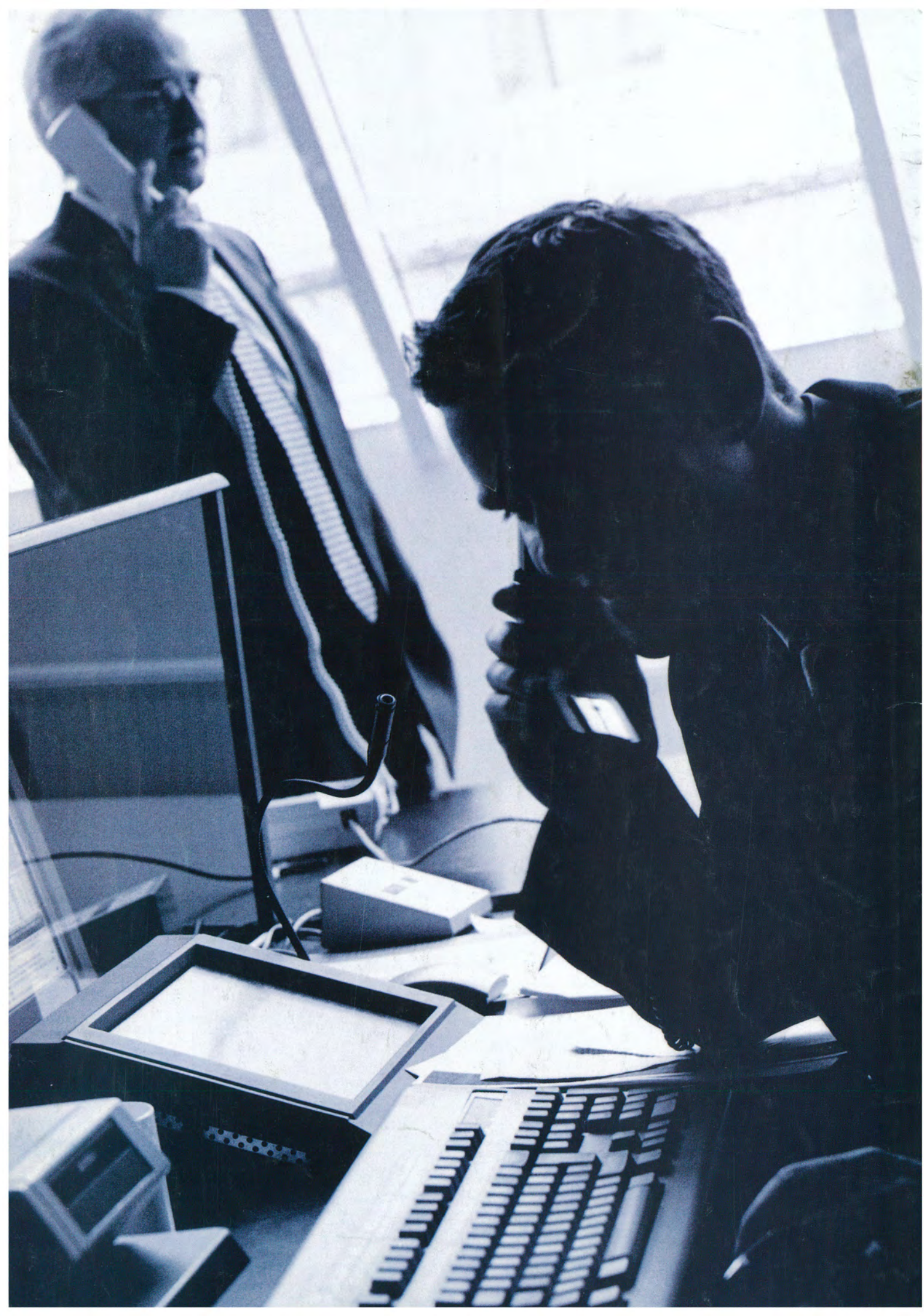
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APPENDIX C

WORKING ENVIRONMENTS FOR PEOPLE AND COMPUTERS



ENJOYING YOUR WORK



What is it that distinguishes a good working environment from a bad one? Why do you feel stressed in some work places while you feel full of energy in others? What is the difference?

A good work place should be easy to work at with all the appliances you need in good working order and no hitches. Then you can enjoy your work. That is when it feels easy to get the job done.

It should be as simple as that!

DIFFERENT SOLUTIONS TO MEET DIFFERENT DEMANDS

The trend of the 1990's with open office landscapes and office furniture on wheels is a good thing when you need to make changes in an office layout as work tasks vary. The "virtual office" as a static entity does not really exist, but is created for each new day, week or project. Work places are adapted more and more often for temporary functions rather than for some particular individual.

In other cases traditional solutions with modules, partition walls and fixed work places prove to be more suitable.

There is always more than one solution for each combination of work premises, the task at hand and the values of the company itself.

It's a question of finding the optimum solution.

NOISE, AIR, LIGHTNING AND TEMPERATURE

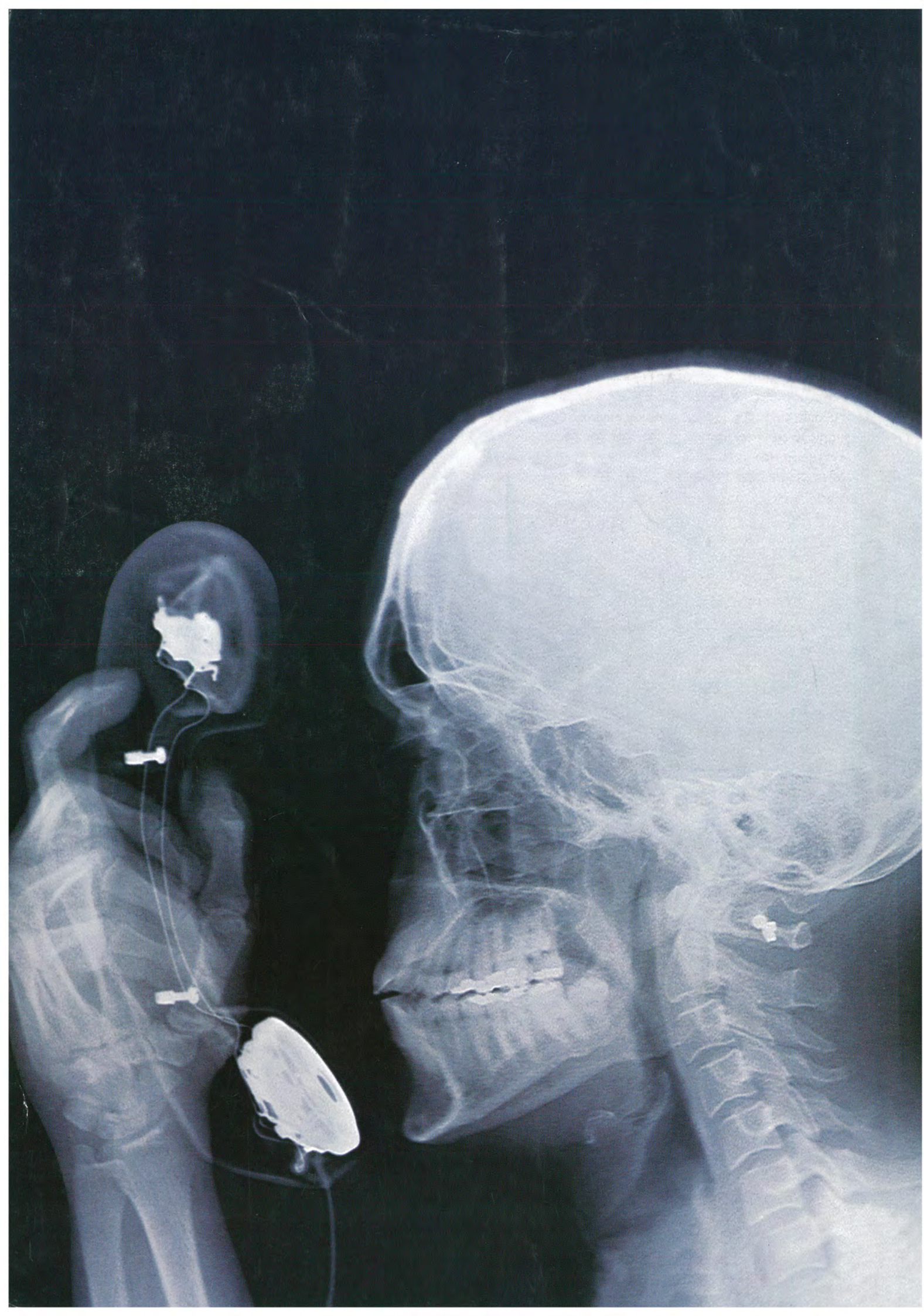
Whatever solution you may end up choosing, the goal is always the same: To create an ergonomic and sound environment where you can work at ease. It should be aesthetically pleasing, provide good quality air and give you a constant and pleasant temperature as well as lighting that is well suited to your needs. Also, the level of noise should be as low as possible. A good working environment should also continue to function even if the unexpected should occur. For example, when your hard disk or network breaks down, you must be able to carry on without any interruption.

That's the kind of work place that has the prerequisites for giving you a feeling of well-being at your work.

COMPUTERS AND YOUR HEALTH

Developments have made this kind of work place more and more difficult to create. Today's office environments with a lot of technical equipment have added to the old problems of dry air, heat development, irritating noise, etc.

At the same time, the harmful effects caused by office environments with a lot of computers and electrical equipment have created new kinds of symptoms and suffering. For those people who are afflicted by these symptoms as well as their employers, the costs in terms of human suffering, rehabilitation and reduction in productivity are quite substantial.



WE PUT PEOPLE FIRST

All things should be judged or measured according to the way people react to them. A work place only functions well if people are happy in their working environment. And for people to function properly in their working environment, everything else must function well too! The interplay between people and technology is especially important, not only when everything is functioning properly, but especially when something unforeseen happens or when the time comes for making changes and expanding.

OFFICE ENVIRONMENTS WITH A LOT OF ELECTRONICS

Work in offices nowadays has been rendered a lot more effective on account of a flood of electronic and technical equipment. However, this has also led to an increase in harmful effects, some of them both unexpected and scientifically disputed.

Problems have often arisen when changing display screens or when being exposed to an increase in high-frequency magnetic fields. Some typical symptoms are: Prickly heat and red blotches on the face, irritation in the eyes and mucous membranes, headache and general fatigue. It is also notable that these symptoms subside at weekends.

Many researchers are of the opinion that several factors such as a combination of heat, poor quality air, an environment with lots of electricity and being exposed to electromagnetic fields, all play a part in causing these symptoms.

Although research is not yet conclusive with regards to the causes of these symptoms – at least not in a strictly scientific sense – all parties agree on the fact that computers and environments with a lot of electricity have given cause to an increase in certain harmful effects, causing greater risks to our health.

OFFICE FURNITURE THAT GIVES YOU A SOUND WORKING ENVIRONMENT

Yesterday's solutions were made to solve yesterday's problems.

Today's office environments must be designed to provide a pleasant indoor climate and aesthetically constructed workplaces – everything being within easy reach and in the right place. Besides this they must also solve the complicating factors of a working environment where people are exposed to electromagnetic fields.

Researchers agree that it is possible to do something about these symptoms. There is also a clear connection between how quickly and extensively an environment is made sound and healthy and how soon workers in such an environment begin to feel better.

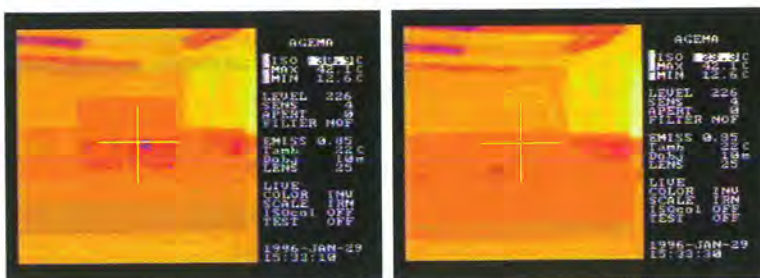
A workplace that includes a display screen is surrounded by a number of electromagnetic fields: Low-frequency magnetic fields, electrical alternating fields, radio-frequency fields and electrostatic fields.



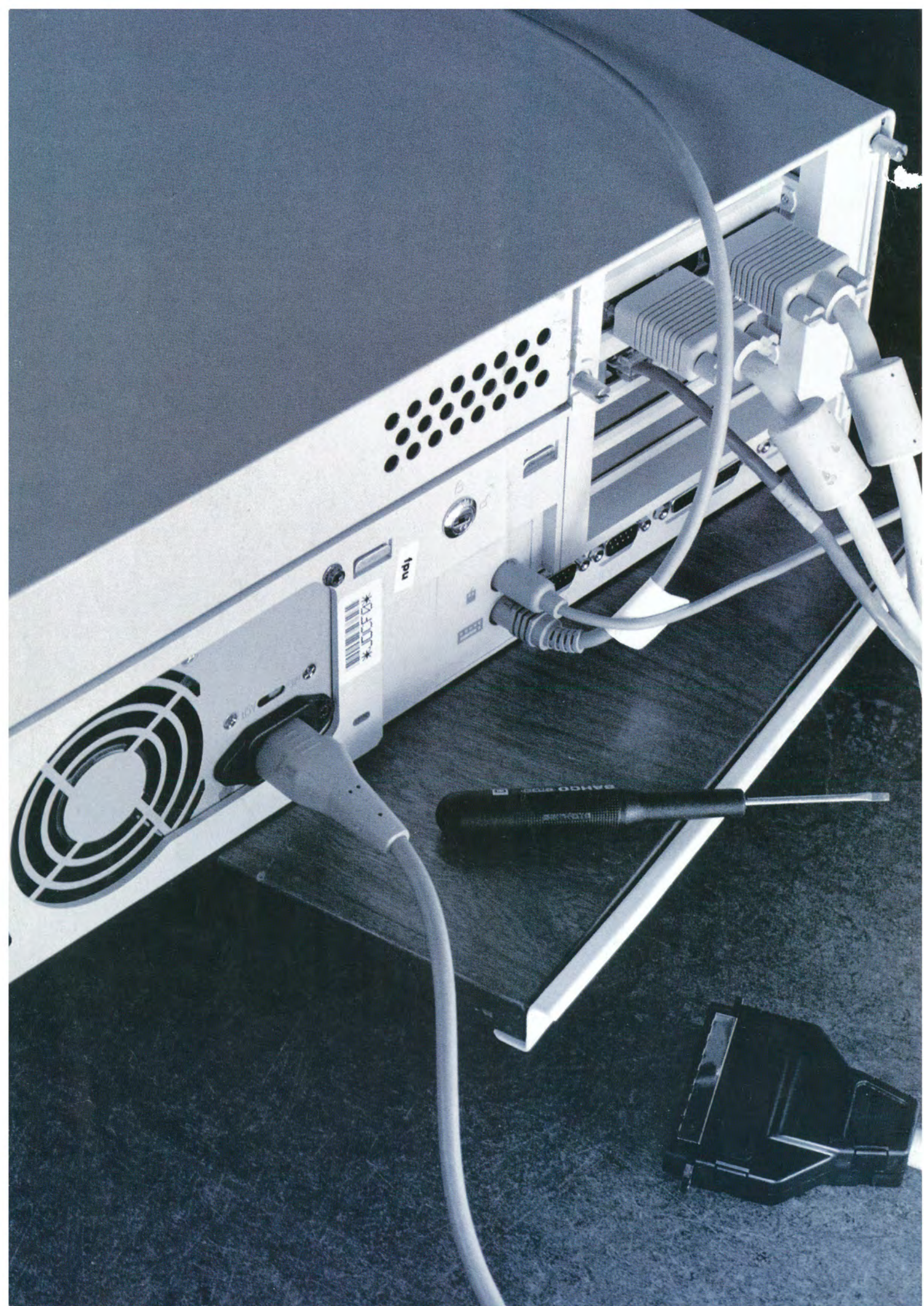
PREVENTING HARMFUL EFFECTS

If you are thinking of arranging or changing an office environment that includes a lot of technical equipment, it would be well worth your while considering how you can prevent harmful effects that may arise.

Our job is to create such office environments: Office furniture that gives you the best possible protection against harmful effects from both old and new sources.



Using an infra-red camera, it is easy to see how heat radiation from a display screen decreases when it is shut in behind Liberel's protective glass.



Liberel's office furniture provides you with a complete solution to your needs. A solution that is well thought out, ergonomic and aesthetic. In actual fact, this office furniture has been developed to solve a number of sticky problems. Here are the most important:

If you put ninety display screens and sixty computers together with thirty people in an office, you will generate approximately 17 kW of heat, which is enough to heat up two normal one-family houses. The air becomes characteristically dry, especially in winter. Exposure to electromagnetic fields increases dramatically. Noise from all the hard disks becomes unacceptably high and you get a maze of cables which makes it difficult for service men to find their way when carrying out service and repairs. Besides this, office space is used ineffectively, as more and more space is taken up for improvised solutions.

SOLVING THE PROBLEM OF HEAT AND DRY AIR

Conventional cooling methods result in temperature variations, dry air, draughts and the risk of condensation.

Liberel has solved this problem by means of an internal cooling system that disposes of excess heat from hard disks, display screens and other such equipment. Cooling takes place at the very source of the heat – in the office furniture itself, by means of water, air and other cooling agents. In this way, heat and dry air is reduced dramatically. Apart from a better office climate, this leads to reduced costs compared to conventional cooling methods. Property owners avoid complaints and demands to improve office conditions leading to investments that would result in an increase in the rent.

REDUCING ELECTROMAGNETIC FIELDS

The furniture in its entirety, including the protective glass, is encased and earthed electrically. Scientific measurements carried out by the Swedish Institute of Radiation Protection (ref no: 5279/569/94), show a drastic reduction in the level of electric alternating fields.

Liberel's integrated solution to this problem means a saving in costs compared to improvised solutions that become necessary as health problems arise.

BETTER SERVICE

Liberel's furniture is constructed in such a way that service can be carried out while work continues. Service can be carried out on the CPU and display screens from the back/inside, where all cables are also accessible.

Lost time is kept to an absolute minimum when moving into new offices making it necessary to integrate a lot of technical equipment into the new environment.

REDUCING NOISE THAT IS A SOURCE OF IRRITATION

In an office with a lot of computers employees have to put up with irritating background noise caused by cooling fans and hard disks. This noise disturbance is dealt with effectively when Liberel's office furniture is enclosed and all the doors are shut.

ERGONOMY WITH FLEXIBILITY

Liberel's office furniture is adjustable. Desk height and display screens can be adapted to each individual. The protective optical glass is conductive and gives a pleasant reflection-free picture which has a rich contrast.

Liberel's office furniture can be adapted to match existing office furniture as far as measurements, design and kind of wood are concerned. Straight and bent modules of different dimensions make it easy to fit in.



1. The central unit's encased functions: Cooling, ventilation, cables and electrical parts are easy to get at. Built-in flexibility often makes service and repairs possible without having to break off work. When it is unavoidable, as in the case of moving office or extensive repairs, breaks in work are reduced to a minimum.

2, 3. Liberel's office furniture offers a flexible solution with several functions and technical aids being integrated into one small area, creating a well-arranged and easily accessible work place.

4. When the protective glass is turned up, you can see the cooling element behind the display screen. The approximately 14 degree cold water creates a pleasant work climate. Dry air and heat are effectively taken care of at the source itself.

5. Liberel has acquired an excellent knowledge of the interplay between technology, people and working environments. Electromagnetic fields generated by display screens and other technical equipment is dramatically reduced. The office furniture, including the protective glass, is completely earthed.

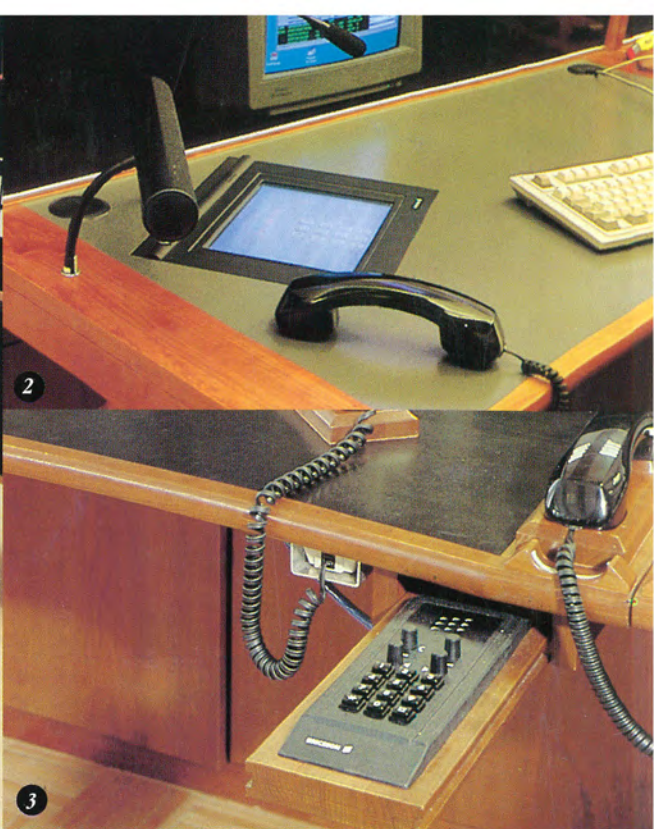
6. Different people, just like different work places have different needs. Sometimes work is best carried out in a standing position. Liberel's office furniture is easy to adjust.

7. All electrical cables are encased and easy to get at. They are well protected from dust and mechanical wear and tear.





S-931 78 Skellefteå, Sweden, Tel +46-(0)910-25920, Fax +46-(0)910-10881, Stockholm, Tel +46-(0)8-93 92 67.





ROOM FOR CHANGES

When there is a need to make changes, the chance also arises to make improvements - whether it is a question of moving, rebuilding, expanding, making better use of the existing space or simply reorganizing your work place. At such a time it is possible for you to plan the best work environment from the very start, before problems arise, thereby creating the optimum office environment.

MAKE DEMANDS ON THE FURNITURE, NOT THE PREMISES

It is quite natural to think in terms of the premises when you think of such demands as air quality, temperature, space, communication networks, wiring, etc. The rent is valued according to whether or not the premises meet these demands.

In order to create options and to save money, we at Liberel choose to look at things in a different way.

First we take a look at the premises themselves - either existing or new - premises that fill the basic demands with regards to location, size, style and cost.

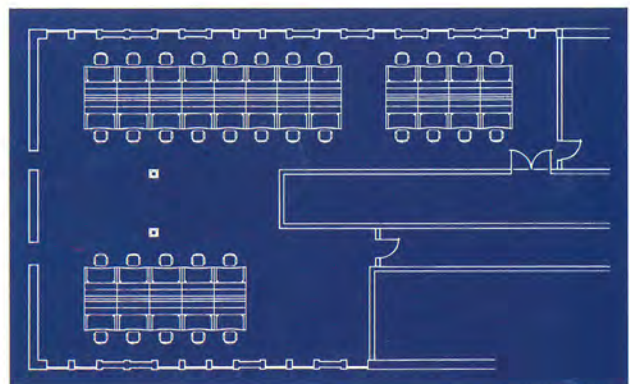
Then, as far as any other demands are concerned, we take a good look at the different solutions we can offer with our office furniture. People must be able to concentrate their time and energy on the job at hand. Nothing else. No time wasted!

SMOOTH SERVICE AND EASY CHANGES

Being completely dependent on computers in your work has its advantages and disadvantages. If, for some reason, the computers stop; work stops too.

It is therefore vital that maintenance and service can be carried out as smoothly as possible. Changes and rearrangements should not take more time than is absolutely necessary and flexibility must be integrated into office furniture.

It can be expensive allowing for future growth from the very start. It is far better to choose solutions that allow you to make changes and expand when the time is right for it. This calls for solutions that make it possible for people and machines to carry on working at all times, as well as built-in preparedness for making changes and developing.



An example of how Liberel's fittings make effective use of the space in an existing office.

APPENDIX D



Hypersensitive in IT environments

Information concerning problems
caused by hypersensitivity to electricity.

Facts and advice to members of SIF.



SWEDISH UNION OF CLERICAL AND TECHNICAL EMPLOYEES IN INDUSTRY
- for individual and industrial development -

Så kan elöverkänslighet förebyggas på din arbetsplats

Stockholm(NW)

Elektriska och magnetiska fält runt datorer, kopiatorer, skrivare och andra elektroniska apparater kan orsaka besvär som sedan leder till elöverkänslighet.

Men med några enkla åtgärder kan problemen

när dessa laddas elektrostastiskt och hamnar i det magnetiska fältet, fortsätter han.

Fritt från kemikalier

Materialet i bildskärmar och annan kontorsutrustning är annat som, enligt Bruno Hag, måste åtgärdas.

- Kraven på att bildskärmar ska vara fria från TCO-miljövänliga.

verkänslig och han ser en fördel i att inte prata i egen sak. De senaste 18 månaderna har han hållit cirka 70 seminarier i ämnet och hans arbete också blivit internationellt märksammat.

- Vi får förfråga världen på hjälp.

SIF vill påverka forskningen om elöverkänslighet

SIF fortsätter att driva frågan om elöverkänslighet. Nästa steg är en arbetsgrupp och ett nätverk.

Enligt kongressbeslutet om ska påverka utvecklingen på området. I mitten av ordnade miljöombudsen Bruno Hag första "regimötet" med docenterna Johansson och EMF-teknikern Andersson. Åren sedan medlemmar behandlas om elöverkänslighet. Har SIF tagit klar ställning till elöverkänslighet? SIF är det första förbundet i världen som tagit ställning till att elöverkänslighet är ett problem. Vi är också det första förbundet som kommer ut med riktlinjer om hur man kan förebygga problemen. Kompendiet "kontorsprovaren" kommer i höst. I denna ges punktvisa förslag på hur kontorsmiljöer kan förbättras samt en checklista för el- och bildskärmsanvändning.

I SIF-undersökningar om elöverkänslighet

Många törs inte avslöja sin elöverkänslighet

UMEÅ (VF)
Elöverkänslighet psykiskt betingad. Det hävdar Svenska Industri- och Arbetsförbundet, och är uttalandet med det första förbundet som tagit ställning och nu också går ut med en arbetsgrupp.

Attention has been drawn to the question of hypersensitivity to electricity in Swedish press, radio and TV. A few of the head-lines are: "How to prevent hypersensitivity to electricity at your work place", "SIF wants to influence research on hypersensitivity to electricity", "Many people dare not reveal hypersensitivity to electricity", "Swedish Board of Health and Welfare: Patients often treated with nonchalance", "Hypersensitivity to electricity charted", "Ban dangerous chemicals in computers", "Hypersensitivity to electricity a growing problem", "Rose of the week: SIF allocates funds to electricity researcher".

Överkänslighet mot el kartläggs

Regeringen håller på att trycka på sig initiativet när det gäller den omdebatterade frågan om elöverkänslighet. Bakom aktionen står socialminister Ingela Thalen som personligen engagerat sig för de drabbade och deras problem.

mentet att under 1996 kartlägga bland annat hela den svenska forskningen, kommunernas ansvar för elsanering och skydd mot elektromagnetisk strålning, behandlingsmetoder för vårdens. En

Förbjud farliga kemikalier i datorer

Totalförbud mot alla farliga kemikalier i datorer och annan elektronik. Det kräver SIF:s arbetsmiljöombudsman Bruno Hag. SIF vill att TCO:s miljömärkning annars ska vara till nytta.

Veckans ROS

SIF ger pengar till elforskare

SIF ger den omstridda neurobiologen Olle Johansson vid Karolinska institutet 100 000 kronor till forskning om elöverkänslighet. - Det är utomordentligt glädjande, säger professor Sten Grillner, chef för institutionen för neurovetenskap på Karolinska institutet.

Elöverkänslighet växande problem

KRISTIANSTAD. Christin Wennberg är elöverkänslig. Hennes problem började i februari 1991. Hon fick värme- och kyla i ansiktet, kände sig allmänt förkyld, hade grus i ögonen.

Elöverkänslighet är ett växande problem på arbetsplatser. Menar SIF, som under 1996 ska kartlägga problemet.

Hypersensitive in IT environments

Facts, advice and support to people who are worried about
and troubled by electric and magnetic fields and
chemical emissions from electrical equipment
in their working environment

FACTS from SIF's reports concerning
hypersensitivity to electricity _____ Page 3

ADVICE to those wanting to know
what to do about it _____ Page 7

SIF takes hypersensitivity to electricity
seriously _____ Page 14

HUMAN EMC
Electromagnetic compatibility
with mankind _____ Page 16



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SIF's report from 1996 shows

that the number of people who stated that they have *serious* or *extremely serious problems* has doubled in comparison with 1993. The number with *extremely serious problems* had increased from 3.1 to 7.6 per cent and the number of serious problems had increased in the latter investigation from 10.6 to 20.3 per cent.

”

FACTS

from SIF's reports
concerning hypersensitivity to electricity

*Hypersensitivity to electricity
among members of SIF
1993 enquiry*

In 1993 SIF carried out an extensive enquiry into hypersensitivity to electricity among its members. The reason for the enquiry was increased concern and problems from an ever-increasing use of electricity. All SIF members were afforded opportunity to describe symptoms of hypersensitivity to electricity. A club questionnaire was also included with questions to union sections, white collar worker clubs and work place ombudsmen. At the end of 1994 SIF presented a final report in which the responses to the questionnaires had been scientifically processed. According to the report many SIF members were affected. Up to one in ten white collar workers noted some form of trouble caused by electrical apparatus. An estimated 6,700 cases of hypersensitivity to electricity were found among the union members.

In 1995 a twelve-page summary, *Hypersensitivity to electricity*, was made of the final report. It attracted considerable attention and was translated to German and English. In easily-understood form it presented facts about hypersensitivity to electricity, who is affected by it, where and how symptoms appear, and a plan of action.

In November 1996 SIF compiled a new report. This aroused considerable interest since the results in 1993 had been so alarming. Had the members' problems increased or decreased? The new report, *Hypersensitivity to electricity*, shows that the problems have increased. The number of SIF members who complained that they have serious or extremely serious problems had doubled in two years!

This pamphlet presents facts from the latest report, and information as to what those affected can do about it.

By 1996 roughly twice as many people suffered from each of the thirteen symptoms listed in the 1993 questionnaire. As previously the problems were concentrated to the face and the problems here had substantially tripled. From eyes, nose and mouth, facial skin, and physical pain.



*Hypersensitivity to electricity
Report from an enquiry among members*

FACTS

from SIF's reports concerning hypersensitivity to electricity

EYES

Symptoms: Difficulty in seeing, smarting, pain in eyes and feeling of grit in the eyes. Eye trouble is the most frequent symptom.

1.

In 1993 26.4% of those asked stated that they had serious trouble with their eyes.
In 1996 the number had increased to 48.4%.

In 1993 4.9% of those asked stated that they had extremely serious trouble with their eyes.

In 1996 14.6% stated that they had extremely serious trouble.

Three times the number in three years!

SKIN

Symptoms: Skin feels dry, redness and blotchy complexion. Skin and eye trouble are the two most frequent symptoms of hypersensitivity.

2.

In 1993 21.6% of SIF members asked stated that they had serious skin problems.

In 1996 the number had increased to 44.6%. Double.

In 1993 4.7% had extremely serious skin problems.

In 1996 the number was 12%. That is a tripling of extremely serious skin problems!

NOSE

Symptoms: Stuffed nose, runny nose and sinusitis.

3.

In 1993 13.7% of those asked had serious nasal problems.

In 1996 25.4% stated that they had serious problems.

In 1993 2.3% had extremely serious nasal problems.

In 1996 5.6% stated that they had extremely serious trouble.

More than double!

STINGING FACE

Symptoms: Face feels hot, swollen, stings, and blisters appear.

4.

In 1993 13.9% had serious facial problems.

In 1996 36% stated that they had serious problems. Almost a tripling in three years

In 1993 4.2% had extremely serious problems.

In 1996 it was 11.7%.



MOUTH

Symptoms: Sores, blisters and metallic taste in the mouth.

5.

In 1993 7% of those asked had serious problems.

In 1996 the proportion had increased to 15%.

In 1993 1.2% had extremely serious oral problems.

In 1996 the number had increased to 3.7% among those asked.

FACIAL PAIN

Symptoms: Besides all over the face, the pain is concentrated in teeth and jaws.

6.

In 1993 9.1% had serious problems.

In 1996 the proportion was 24.3%. That's almost a tripling in three years.

In 1993 2% had extremely serious problems.

In 1996 the number had more than tripled. 7.4% stated that they had extremely serious problems from facial pain.

MUCOUS MEMBRANES

Symptoms: Dry mucous membranes and abnormal thirst.

7.

In 1993 13.5% of those asked had serious problems.

In 1996 the number with serious problems has risen to 29.4%.

In 1993 2.4% stated that they had extremely serious problems.

In 1996 the number had increased to 6.5%. Double!

HEADACHES

Symptoms: Not only headaches but loss of memory and feelings of depression.

8.

In 1993 17.9% of those asked had serious problems.

In 1996 the number had more than doubled to 37.6%.

In 1993 4.2% had extremely serious problems.

In 1996 the number had doubled to 8.8%.

FACTS

from SIF's reports concerning hypersensitivity to electricity

TIREDNESS

Symptoms: Abnormal tiredness and difficulty in concentrating.

In 1993 20% had serious symptoms of this type.

By 1996 the number had doubled. 42.9% had serious trouble with tiredness and difficulty in concentrating.

In 1993 the number with extremely serious problems was 4.9%.

In 1996, three years later, 11% stated that they had extremely serious trouble.

DIZZINESS

Symptoms: Feeling of faintness, nausea and dizziness.

In 1993 8.8% stated that they were seriously troubled by these symptoms.

In 1996 the number had more than doubled to 19%.

In 1993 2.3% were extremely seriously troubled by giddiness.

In 1996 the number had increased to 5.3%.

BREATHING

Symptoms: Difficulty in breathing, palpitations.

In 1993 5.8% had these serious problems.

In 1996 the number had increased to 14.5%.

In 1993 2% of those asked had extremely serious difficulty. *In 1996* the proportion of those with extremely serious difficulty had increased to 4.2%.

JOINT PAINS

Symptoms: Pain in shoulders, arms and joints.

In 1993 22.4% of SIF members had serious problems.

In 1996 the number of 35%.

In 1993 5.3% of those asked answered that they had extremely serious trouble with joint pains.

In 1996 the number had increased to 10% – substantially double.

NUMBNESS

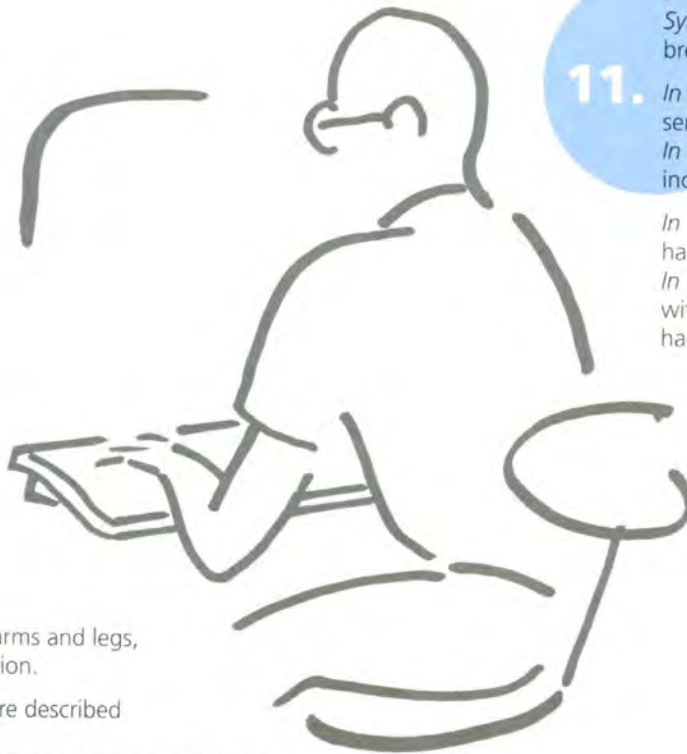
Symptoms: Numbness in arms and legs, cramp and pricking sensation.

In 1993 the symptoms were described as serious by 12.9%.

In 1996 24% stated that they had serious symptoms.

In 1993 2.8% had extremely serious symptoms.

In 1996 the number had increased to 7.1%. That is thus double as many who indicated that they were troubled by numbness, cramps and pricking sensation.



If all 13 of the symptoms listed are combined it is found that the number of SIF members stating that they suffer serious problems has doubled.
In 1993 10.9% of those asked stated that they had serious problems.
In 1996 the number had increased to 20.3%.
In 1993 3.1% stated that they had extremely serious problems.
In 1996 7.6% stated that they had extremely serious problems.
That is more than double in three years.

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You are the one to notice

the warning signals from your body. Regardless of whether your health is affected by electric and magnetic fields, chemical emissions or something else, it is your own self-diagnosis, your own impression of your state of health that matters.

All measures taken, such as reorganization of electrical systems, etc., being put on the sick list, rehabilitation, must depart from this fact.

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ADVICE

on what to do

ELECTRIC AND MAGNETIC FIELDS are becoming denser around us, both at home and at work. They are polluting our environment and every tenth white collar worker suffers in some way from them. Besides problems from electric and magnetic fields it is now suspected that many chemicals are emitted from electrical apparatus. These are frequently placed close to the user and in areas without sufficient ventilation to remove the damaging substances. The problems are thus caused both by electric and magnetic fields and also by the chemicals emitted by the apparatus.

Most research does not support sufferers. Research takes a long time. DDT, growth substances, asbestos plates and liquid putty were used for many years. People became ill but it took decades before research workers were able to establish the health risk.

Neither do those affected receive much support from society. Doctors seldom diagnose the problem as hypersensitivity to electricity. Furthermore, the social insurance office refuses to accept this diagnosis.

The supervising authorities are sceptical to reorganizing electrical systems in work places. It is considered too expensive. However, it is often quite the contrary: the insurance company Skandia is one of several companies that has reorganized the electrical systems at its work places. Skandia sets aside SEK 100 per employee and this has resulted in a dramatic reduction in sick listing. 300 SAS employees had symptoms prior to reorganization of electrical systems and other measures. Today no-one is sick-listed for hypersensitivity to electricity and the company has established a purchasing policy for display screens and electrical apparatus.

SIF's objective with this publication is to provide facts, support and advice to its members. As a member you are entitled to know your rights and to be able to arrive at a solution to your problems.

The following pages offer information and hints on how to act in approaching your colleagues, union, employer, company health services, medical services and local social insurance office. Information is also provided about various supervising authorities and their areas of responsibility.

What to do if you suffer symptoms

AT WORK we are surrounded by a constantly increasing quantity of electrical apparatus. Computers, copying machines, printers, mobile telephones, fluorescent lighting, coils of cables, etc. all generate electric and magnetic fields. Health-impairing chemicals such as flame-resistant compositions are also emitted from the apparatus.

Problems from electrical equipment constitute a work environment problem. It is the responsibility of the employer to ensure that no employees suffer ill-health. The employer shall draw up a work environment policy which is updated following a specific plan. The work environment shall be checked regularly and problems dealt with. According to the work environment act, measures shall be taken to prevent all imaginable forms of work environment damage.

THE PRECAUTIONARY PRINCIPLE shall prevail. According to the work environment act *concern* over the situation in the work environment is sufficient reason for the employer to take measures. On the basis of known working life know-how, risks or possible injuries from electric and magnetic fields, for instance, shall be prevented and remedied. Limit values for electro-magnetic fields no longer exist. The precautionary principle has been adopted by the supervisory authorities.

Environment ombudsmen are available at SIF's branch offices and at the union's offices in Stockholm, who can give you, your colleagues and the management advice and opinions. An overall view is essential to ensure success in questions of hypersensitivity to electricity.

DON'T WAIT to take up problems. From the responses to the questionnaires it is evident that many people (particularly men) remain silent about their discomfort. It is important to start a discussion at the work place as soon as symptoms of hypersensitivity to electricity appear. Relatively simple measures may be sufficient if the problems are dealt with early. Start by listing and documenting problems. Get the work environment ombudsman to help. Go through the following points:

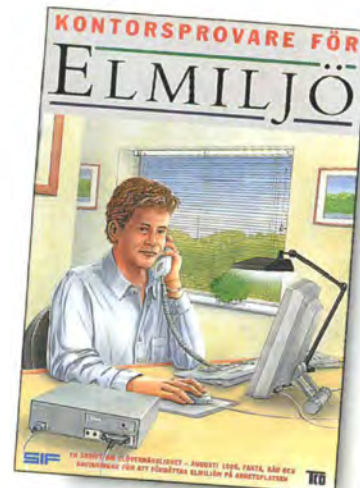
- Which apparatus is/are causing the problems?
- Are there several in the company who may experience problems?
- What is the situation at other similar work places?
- Is expert help available for study and analysis of the electrical work environment?
- Does the equipment comply with requirements drawn up by the company or required locally by SIF?
- Carry out study visits to companies which have implemented successful reorganization of their electrical systems, in order to get ideas for various types of solutions and to exchange experience.

According to the work environment act the employer is responsible for ensuring that no employee suffers ill-health

SIMPLE MEASURES can be taken to improve the work environment and prevent problems. Move electrical equipment further away from your own work place. The distance to the computer screen should be 70–80 cm and spectacles for use during work at computers should be adjusted for this distance. Try to limit the time spent working at the computer screen. Another important measure is to keep the whole office as free from dust as possible. Try to have a clean desk and clean floors. Other simple measures:

- Replace fluorescent lamps with earthed lighting and bulbs
- Avoid steel constructions in office equipment when building or converting
- Sort out cable coils
- Allow newly purchased office equipment to run at maximum power for several days in a well-ventilated room that is not used as a work place (This eliminates problems from chemical compounds being emitted from various components in new equipment.)
- Check the ventilation
- SIF's *Office Tester for Electrical Environments* is a good help. This is a guide to preventing hypersensitivity to electricity and can be used in the work of planning internal control. It provides a list of various critical points that should be checked and dealt with.

*Office Tester for
Electrical Environments*



If you have to seek medical advice

YOUR OWN OPINION SHALL BE RESPECTED. It is *your feeling* which is relevant. You should not have to “prove” that you are not feeling well. If you talk to your boss, the company doctor or another doctor about your problems, your opinion, your feelings shall be the starting point for the conversation.

In May 1997 a major investigation from Lund University was presented in which 40,000 patients had been monitored for 14 years. The research workers ascertained that people are very well able to observe the body's warning signals themselves. The conclusion was that considerably more attention must be paid to what the patients themselves say.

CONSULT THE COMPANY'S DOCTOR if your trouble becomes acute. Most companies have either their own company health service or are associated with a health service. If this is not the case at your place of work, then consult your own GP.

The level of knowledge concerning hypersensitivity to electricity varies greatly in company health services and public health services. Don't be satisfied with ointments and pain-killers that just relieve the symptoms for the time being. Listen instead to your body's warning signals and seek the cause of the problems.

To discover the cause of your problems, start by talking to your work colleagues. There may be others who react like you do. Go to your boss and to the work environment ombudsman. Request a meeting at which you take up your problems. A representative from the company health services may attend the meeting. Take up such problems as: What your symptoms are; Which electrical apparatus may have caused the symptoms; Is there any experience in the company of dealing with these problems? Draw up a time schedule for concrete measures. It is important that a record is kept of the meeting.

IT IS IMPORTANT THAT YOU YOURSELF ARE ACTIVE and push for feasible solutions. Rely on your symptoms and make sure that the company health services do not look upon your problem solely as a medical or psychosomatic problem but as a work environment question. Demand that an analysis of the work environment be carried out before any referral to skin specialists or the like is written out.

TURN TO THE PUBLIC HEALTH SERVICES if you have acute problems and the company you work for has no company health service. You can also be referred by the company's doctor. It may be a good idea to have a close relative or friend who knows about the problem with you when you visit the doctor. Two understand more than one and it helps to have the support of someone who is not so emotionally involved as oneself.

You must be prepared to be active. Discuss your problems thoroughly with the doctor, your symptoms and what you think is causing them. *Do not demand a diagnosis of "hypersensitivity to electricity"*. It is not accepted by the social insurance office. Keep to specific symptoms instead – headache, burning face, problems at the computer screen, etc. Make sure they are entered in your case record.

If you visit the medical services several times it may be a good idea to read through your case record together with the doctor so that you can explain and emphasize certain things. If anything has been left out or is not clear from the notes you can ask to have it entered. Good documentation provides legal protection for both doctor and patient.

"Treatment of patients who relate their problems to amalgam or electricity" is a pamphlet which can be ordered from the Swedish National Board of Health and Welfare. It is included in the Board's statute book *"General advice"*, and is published as guidance to medical staff, particularly doctors in primary medical care.

"Hypersensitivity to electricity" is not accepted as a diagnosis.

THE SOCIAL INSURANCE OFFICE (local and national) does not accept a diagnosis of "hypersensitivity to electricity". However, the insurance office must consider all *symptoms* of hypersensitivity to electricity. According to the definition in a letter from the Swedish Ministry for Health and Social Affairs to the Swedish National Social Insurance Office, the following should be deemed an illness:

...Any abnormal state of body or mind not in keeping with the normal process of life is designated an illness...

The senior consultant of the Swedish National Social Insurance Office comments on the Ministry's definition as follows:

"An expert opinion concerning being allergic to electricity directed to RFV, the Swedish National Social Insurance Office, confirms that it is sufficient that the clinical symptoms show that functional ability is affected. The patient cannot be blamed for the fact that the diagnosis is scientifically unclear."

The RFV writes as follows in an investigation (November 1996) concerning rules for compensation in cases of hypersensitivity to electricity:

"Problems or symptoms the insured person suffers from may in certain cases give entitlement to sickness benefit, at least for short periods. These may be problems such as headaches, tiredness, dizziness, nausea, rashes, mental disturbances, etc. It is not necessary for the cause of the problems to be explained but for the insured person to be entitled to sickness benefit the problems/symptoms must reduce his/her ability to work."

Major decisions on early retirement, handicap compensation, mileage allowance and the like shall be determined by the municipal social insurance board. If you are notified that your sickness benefit is to be withdrawn you can ask for the case to be reviewed. You can request to be present yourself, or through a representative, to argue your case at the meeting of the Board.

If the Insurance Office cites an assessment from the insurance doctor you are entitled to request a meeting with the doctor to state your case and to "give the problem a face".

If you become ill – file an industrial injury report

IT IS CURRENTLY EXTREMELY DIFFICULT to have hypersensitivity to electricity classified as an industrial injury. If hypersensitivity to electricity is classified as an industrial injury the insurance offices will automatically appeal against the decision and it is without exception revoked in higher instances. Furthermore, the new industrial injury regulations have in general made it more difficult to get injuries on the job classified and approved as industrial injuries.

However, to draw attention to the problem it is important for as many people as possible to act as often as possible so that the extent of the problem of hypersensitivity to electricity appears in official statistics.

THIS IS WHAT TO DO when you experience problems from electromagnetic fields or chemical emissions from apparatus at the work place. Inform your boss, the work environment ombudsman and your company health services (or public health services), and make sure that the problems are documented!

It is the employer's responsibility to investigate all cases of ill health, to perform risk analyses and to compile statistics every year concerning the state of the work place (according to regulations of the Swedish National Board of Occupational Safety and Health on internal control of the work environment).

If you become ill as a result of the electrical environment, make sure that the employer files an industrial injury report. It is important that it is signed by the employer, you yourself and the work environment ombudsman. The report shall be sent both to the insurance office and Labour Inspectorate.

What does the Labour Inspectorate do?

THE LABOUR INSPECTORATE IS A REGIONAL SUPERVISORY AUTHORITY which examines how the work environment law is applied in practice. The Labour Inspectorate offers advice, performs inspections and sometimes writes injunctions to take measures.

The Labour Inspectorate can be called in, preferably in agreement with the local work environment ombudsman and your immediate superior, to contribute with an analysis of your work environment situation: heating, ventilation, chemical emissions, density of electrical apparatus, unearthed tubular steel constructions, etc.

Since there are as yet no limit values for the most usual electrical office machines, a discussion of the work environment can be held with the Labour Inspectorate based on the Office Tester, the Swedish Confederation of Professional Employees' guide values and official precautionary principles. The pamphlet entitled "*Official precautionary principles relating to low-frequency electric and magnetic fields, Guidance for decision-makers*" is available from the Swedish National Board of Occupational Safety and Health. The Labour Inspectorate also gives advice and answers questions on the Swedish National Board of Occupational Safety and Health's regulations from private individuals.

SUPERVISION AND LEGAL SECURITY

Parliamentary Ombudsman, JO

JO examines primarily complaints from individuals against official authorities and departments. If, for instance, an authority does not respond to a letter of enquiry, or if the letter has not been recorded as received, JO may be approached and will then determine whether the authority has acted in accordance with current parliamentary and government instructions.

The Health and Medical Services' Responsibility Board, HSN

If you consider you have been treated incorrectly by the medical services you can yourself report the circumstances to HSN who will investigate the matter and determine any consequences for the person responsible. The consequences may vary from a mild disciplinary reminder to revocation of medical authorization.

The Swedish National Board of Health and Welfare

You can also turn to the Swedish National Board of Health and Welfare which is responsible for the public medical services. This Board can investigate information concerning grievances. In the case of serious errors the Board may pass the matter on to HSN or even to a court of law for disciplinary action.

The patients' ombudsman

Advice and support is available from the patients' ombudsman – to be found at all large hospitals. You can discuss the problem here, retaining your anonymity as regards the medical personnel to whom the criticism or grievance applies. The task of the patients' ombudsman is to ensure that a patient's points at issue and legal security are observed should the patient wish to carry the discussion further with, for instance, a doctor.

The Swedish National Board of Occupational Safety and Health

The task of the Swedish National Board of Occupational Safety and Health is to ensure that work environment regulations are adhered to in all public and private companies. Work environments shall be regularly inspected via the various labour inspectorates all over Sweden. A labour inspector can instruct companies to take certain measures in the work environment and can even decide to close down work places. Copies of injuries and accidents at work places and in schools shall be sent to the labour inspectors. Employers, safety ombudsmen and even individuals can turn to the labour inspector concerning such matters as interpretation of the many regulations concerning

work environment existing in the Swedish National Board of Occupational Safety and Health's statute book, AFS.

The Swedish National Social Insurance Board, RFV

The Swedish National Social Insurance Board has the overall responsibility for the local health insurance offices. RFV is responsible for ensuring that the local offices follow the current regulations and issue directives for applying the rules concerning sickness benefit and industrial injury questions, for instance. RFV investigates complaints relating to the local offices and answer questions relating to principles concerning sickness insurance.

Major decisions of the local offices are reached by the social insurance committees consisting of elected representatives. These may concern sickness benefit, handicap compensation, taxi service for the disabled, etc. Appeals may be filed against the decisions in the next instance, the county administrative court.

The Swedish National Electrical Safety Board

The Swedish National Electrical Safety Board is responsible for issuing directives for installation of electrical equipment at work places and in homes. It is responsible for ensuring that the equipment is safe for personal use, reliable and fireproof through the electrical inspectorates existing throughout Sweden. Advice and information is available from either the nearest electrical Inspectorate or to the National Electrical Safety Board in all questions concerning the construction of electrical equipment.

The Swedish National Board for Consumer Policies and the consumer ombudsman, KO

The Board for Consumer Policies and KO shall offer households and consumers advice and support concerning dangerous products, for instance. The product safety act and product responsibility act (as well as the regulations in the Strong current directives at the National Electrical Safety Board) are applicable for electrical apparatus for which KO has inspection responsibility. Clear safety information and instructions for use shall be provided in the Swedish language for all products. Misleading advertising, poor or incomplete information about electrical products are issues that KO investigates and advises consumers on.

Although no limit values are yet defined for electromagnetic fields specifying that a certain apparatus is dangerous, the cautionary principle shall be cited. Does the product information lack guidance as to the cautionary principle or does it even claim that the product is not dangerous? If so the matter shall be pointed out to KO, the National Electrical Safety Board or the National Board of Occupational Safety and Health.

SIF

takes hypersensitivity to electricity seriously

THE LOCAL UNION EFFORTS determine the development of work environment issues. SIF's attitude is to cooperate resolutely with the employer in order to analyse and remedy problems in the work environment. The aim of the SIF club and elected representatives is to work towards environmental burdens from electricity and chemical emissions to be minimized to levels which are harmless to mankind.

To attain this goal SIF must be active in the choice and purchase of equipment and apparatus, resulting in adaptation to the users and thus prevention of illness. This is best achieved by every SIF club or work-place ombudsman (clubless member through contact with the union branch) contributing to a purposeful purchasing policy for equipment for the company being drawn up, with specified requirements (laid down in the work safety committee) for the equipment, based on known facts.

According to SIF's policy, in the case of hypersensitivity to electricity the SIF clubs and work environment ombudsmen shall avail themselves of current know-how, compile experience from the local work place and offer those affected support in various ways. They shall see to it that the employer complies with the laws and regulations in existence and, by cooperating with those affected, represent them when necessary against employers and authorities. They shall also spread know-how and inform their members about hypersensitivity to electricity.

SIF SHALL WORK CENTRALLY towards hypersensitivity to electricity being accepted as an industrial injury, towards those affected receiving rehabilitation, and to research contributing explanations. This has been determined at the last two congresses. SIF therefore carried out the enquiry on this problem among its members and drew up the Office Tester as a practical check list.

SIF's environment ombudsman has established an interdisciplinary network in which various specialists cooperate to draw attention to the issues.

SIF is investing funds in work trial places with associated accommodation sections. There are five of these in Aderstorp, Skellefteå. SIF provides computers and other equipment to enable work to be carried out at a distance. People who are hypersensitive to electricity can test how much electricity they can stand since the work places have different levels of electricity.

SIF is also investing considerable sums in research to find reasons and connections as to why some of us suffer from hypersensitivity in office environments.

SIF is planning to issue a *Guide* on electronic products and apparatus as a tool to give users the knowledge to place demands on products with harmless levels of emission.

SIF's policy with regard to hypersensitivity to electricity

Stipulated by the union's Board 19 June 1995

On its own initiative SIF shall:

- 1.** Take the concern of its members and the problems of those affected seriously. This means that the union endeavours to support those affected through measures.
- 2.** Through education and information the union shall work towards creating a work climate of trust, understanding and accommodation.
- 3.** Through education and information the union shall work towards increasing knowledge about hypersensitivity to electricity.

In cooperation with others SIF shall:

- 4.** By contributing to producing aids, the union shall encourage SIF clubs/work environment ombudsmen to assist those affected.
- 5.** By means of political pressure the union shall encourage intensified research into finding the connection between symptoms and cause.
- 6.** By means of political pressure the union shall work towards hypersensitivity to electricity being classified as an illness and industrial injury.

Congress decisions on hypersensitivity to electricity

In 1990 the SIF congress decided to establish a computer screen scholarship.

In 1993 the congress decided to demand that hypersensitivity to electricity be classified as an industrial injury. The congress also decided to force the requirements for increased resources for research into the factors suspected of triggering injuries in electrical and computer screen environments.

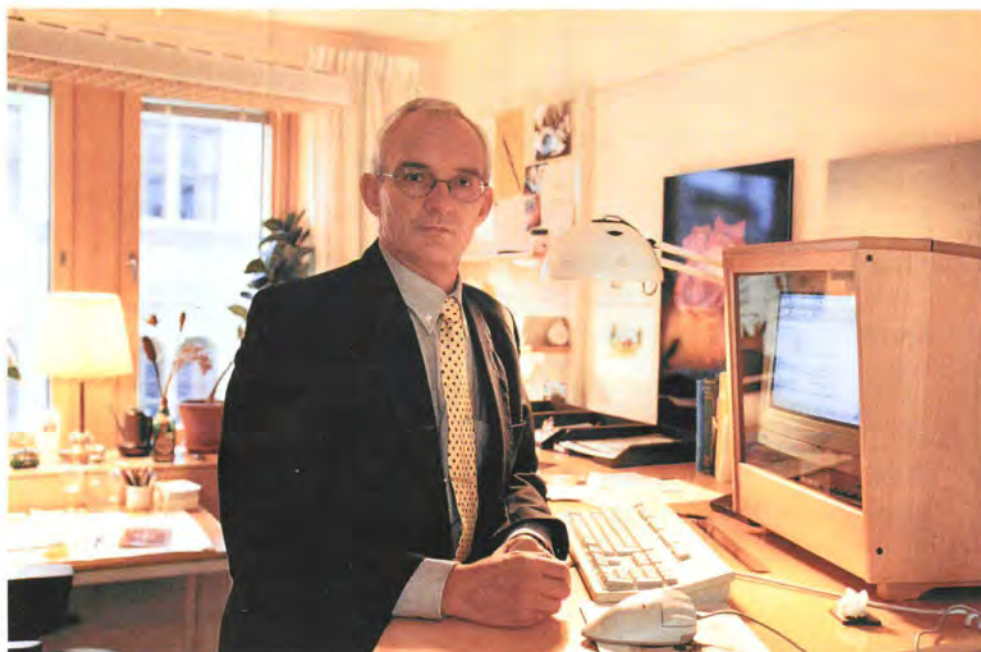
The congress decided to push the issue of financial support to all those with injuries from electricity and computer screens and that SIF shall give strong support to members suffering injuries and shall require improvements enabling everyone to return to work.

The congress decided that SIF shall urge TCO to increase its efforts to find a solution to hypersensitivity to electricity.

In 1996 the congress decided that SIF shall work towards a work environment that does not make anyone ill and that this is a right that goes without saying.

The congress decided that SIF shall provide financial support to the research into hypersensitivity to electricity (MSEK 0.8/year for four years).

The congress also decided that SIF shall continue to further the demand to have hypersensitivity to electricity approved as an industrial injury and that SIF shall help to obtain documentation for a reference work place where those who are hypersensitive to electricity can work.



Nobody should become ill due to the work place. That was what the SIF congress decided. SIF's work on work environment is based on this decision, among others. The decision is in turn based on all the conversations with and correspondence SIF receives from members who have become hypersensitive to electricity as a result of the ever-increasing electronic density in the IT environment at work places.

SIF's latest questionnaire, reported starting on page 6 of this publication, reveals that symptoms of hypersensitivity to electricity are affecting more and more people and becoming increasingly serious. Those affected often lack any support from society. Research is directed to the antiquated explanation of mental disturbance. The health insurance offices withdraw sickness benefit that has already been granted and refuse to grant sickness benefit for new cases of hypersensitivity to electricity resulting in reduced work ability.

SIF's work on work environment into the new century is directed to a human IT environment. SIF is therefore working towards the concept of HUMAN EMC. The EMC directive involves demands on the manufacturer to produce computers that do not disturb a pacemaker, for instance, but there are no directives stating that a computer may not disturb the biology of a human being.

SIF appeals to the art of Swedish engineering to gradually develop electronic apparatus and components which are free of non-functional emissions in the form of chemicals and electromagnetic fields.

We will then have a work environment in which nobody need risk his/her health at the place of work.

Bruno Hagi

*Environment ombudsman particularly concerned with
questions of hypersensitivity to electricity*

Prisad forskning om elkänsliga

Bekvämlighetsflagg. Det var sif-
ordföranden Bo Hennings
karaktistik av läkares, forskar-
ens och myndigheters psykolo-
giska förklaringsmodell till de
elöverkänsligas problem.

Han använde uttrycket i ett
tal när docent Olle Johansson
vid Karolinska Institutet fick ett
pris av förbundet på 100 000
kronor för sin forskning kring
ämbetsförändringar hos patienter
som blivit sänkta av bilskada.

Elöverkänsligas sjukpenning dras in

SJUKPENNING Elöverkänsliga
personer mister sin sjukpenning.
Försäkringskassan drar in den
med motiveringen att elöver-
känslighet inte är en sjukdom.
Elöverkänslighet har inte
accepterats som diagnos av soci-
styrelsen. Då kan det inte vara
grund för sjukpenning.

Nytt projekt för elöverkänsliga

I Skellefteå ska elallergiker från
hela landet kunna testa att
jobba på provarbetsplatser och
bo i speciella lägenheter. SIF
är med och betalar närmare en
halv miljon till projektet.

Sex elsanerade lägenheter och lika
många bostäder.

Få elkänsliga anmäler besvär

Bara var femte elöverkänslig
har anmält sina besvär som
arbetsskada. Och bara var
tredje deltar i någon form av
utredning. Åtgärder
på arbetsplat-
sramgår av en
utredning inom
förbundet. Uppger
utredningsledaren.

Banbrytande insatser för elöverkänsliga

Attention has been drawn to the question of hypersensitivity to electricity in
Swedish press, radio and TV. A few of the head-lines are:

"Prize awarded for research into hypersensitivity to electricity", "Sickness benefit
for hypersensitivity to electricity is withdrawn", "New project for people suffering
from hypersensitivity to electricity", "Major union issue", "Pioneering work for
people suffering from hypersensitivity to electricity", "Few people who suffer
from hypersensitivity to electricity report the problem", "SIF conducting new pilot
case about electricity", "Hypersensitivity to electricity is not a mental distur-
bance", "Readers' opinion: hypersensitivity to electricity at last a union issue".

SIF driver nytt pilotfall om el

SIF ger inte upp hoppet
om att medlemmar som
skadats vid bildskärmsar-
bete ska kunna få detta
erkänt som arbetsskada.
Nu betalar man en jurist
utanför TCO för att driva
saken.

de tre juristerna sade
Britt-Marie Ros-
genomdrivit sin rätt
svara sitt ärende i
varken TCO eller
med jurist. Nu
gå in och med
stående juri-
st ärendet i."

En forskningsstudie gjord vid
Huddinge sjukhus slår hål på
myten att elöverkänsliga perso-
ner skulle ha fler psykiska pro-
blem än andra. Studien presente-
rades på torsdagen vid ett semi-
narium om elöverkänslighet ar-
betslivsforskning i Stockholm.
I Huddingestudien

eller färre problem än kontroll-
gruppen av icke-elkänsliga.
Det symtom på elöverkänslig-
het som brukar dyka upp först är
stickningar i huden. Sedan följer
roddflammighet, torrhet, hett
och/eller brännande känsla, ofta
i ansiktet, och värk. I steg två
finns en tendens till ögonbesvär,
känsla i ögonen liksom ögon-
brinn.

LÄSARNA HAR ORDET

Elöverkänslighet äntligen en facklig fråga

Genom Bruno Hagis insatser har SIF som första för-
bund en policy och målsätt-
ning för arbetet med elöver-
känslighet som i högsta grad
är en facklig fråga.

Det är också en allvarlig
samhällsfråga. Många in-
stanser och verk har delan-
svar för hanteringen men där
vill ingen ta huvudansvaret.

Därför är SIF:s ställnings-
tagande så mycket viktigare.

Numera finns ett omfattan-
de internationellt kontaktnät
mellan enskilda elöverkänsliga
men även mellan sam-
manslutningar som företrä-
der dessa. Därmed inses att
det även är ett globalt pro-
blem.

Det är en gigantisk uppgift
som även andra fackförbund
bör ta sitt ansvar för. Kanske
vår tids största miljöproblem.

Självklart ska elöverkänslig-

lighet klassas som arbetsska-
da. Den debuterar ju oftast i
arbetssituationen.

Vi uppmanar alla som upp-
lever besvär som de relaterar
till arbetet att kontakta sitt
fack. Det är viktigt.

Ett varmt tack till SIF och
Bruno Hagi för det ni nu gjort.
Ett tack också till Gunni
Nordström på TCO-tidning-
en som under många år över-
tygande tagit våra problem

på allvar. Många andra får
också del i vår uppskattning.

Sidan 9 i SIF-tidningen nr
13/95 kommer att gå till his-
torien.

Men – glöm bara inte alla
de elöverkänsliga som svi-
kits under resans gång!

Hälsningar från en påtving-
ad asyl i husvagn i bergslags-
skogarna.

Inger och Axel



In 1993 SIF carried out an extensive enquiry into hypersensitivity to electricity among its members. A summary of the results, "Hypersensitive to electricity" was compiled in 1995. It attracted considerable attention and was translated to German and English. Facts, who was affected, where and how the symptoms appear were presented in easy-to-read form, as well as an action programme.

At the end of 1995 SIF carried out a new enquiry. There was considerable interest in view of the fact that the results from 1993 were so alarming: Had members' problems increased or decreased? It was found that the problems of hypersensitivity to electricity have increased. The number of SIF members who answered that they suffer serious or extremely serious problems caused by hypersensitivity to electricity has doubled in two years!

This publication, **"Hypersensitive in IT environments"** briefly presents facts from the latest questionnaire in which SIF asked all members if they were troubled by hypersensitivity to electricity. It also offers advice on how the person affected can act at work, in contact with the medical services and the national insurance office.

SIF - for individual and industrial development!

- Development of competence and profession
- Individual salaries
- Away with differences in pay between men and women which are not objective
- Shorter and more flexible working hours
- Renewal and growth in industry
- More jobs and support for unemployed members

SIF is

- The union for all clerical and technical employees in industry, building, property, IT, media, energy and consultancy branches
- Independent of political parties.



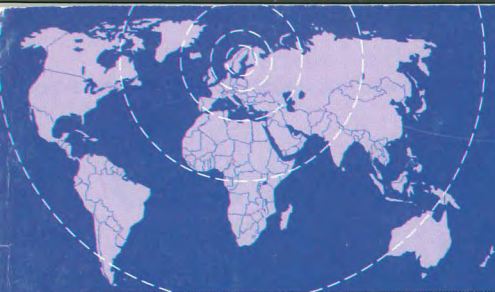
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APPENDIX E



**English
edition**

The Swedish National Institute
of Occupational Health

**Forskning
& Praktik**

om arbetsmiljö

No 4/1992 från Arbetsmiljöinstitutet i Solna och Umeå



**Health and well-being
at VDU-work**



Forskning & Praktik

4/1992

**Forskning & Praktik is published by
the Department of Information and
International Relations at the
National Institute of Occupational
Health in Solna, Sweden.**

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Cover photo

Georg Sessler/Bildhuset
Ultrasonic image of a heart

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Forskning & Praktik
can be ordered without
cost by calling

Förlagstjänst

Tel. (+46) 8-730 98 00
Fax (+46) 8-730 98 88

or by writing to

Förlagstjänst

National Institute of
Occupational Health
171 84 Solna, Sweden

ISSN No. 1102-8394

Printed for Kommentus Förlag AB
by Markaryds Grafiska AB

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material —
but please mention the source.**

Review of research

This English version of *Forskning & Praktik*, the popular science magazine of Sweden's National Institute of Occupational Health, contains a review of the Institute's research on the effects of computerization.

With the physical and mental health of the workers as their primary concern, the Institute's scientists are studying work at computer display terminals, job organization, physical stresses, electromagnetic fields, the design of display screens and a number of other subjects. Indications of ill health serve to stimulate new projects, such as the one on hypersensitivity to electromagnetic fields.

"The computer as tool" has been one of the Institute's priority cross-disciplinary research areas since 1985. Most of the research is being done at the Division of Neuromedicine and the Division of Organizational and Social Psychology in Solna, and the Division of Occupational Medicine in Umeå. Some of the studies also draw on the Institute's expertise in the areas of ergonomics and technology.

Many of the projects are being carried out in collaboration with other academic institutions and research establishments, both in Sweden and abroad. The research is often supported by employers in both the private and public sector.

The Institute's task is not only to study the negative aspects of working life. Since NIOH is a national research institution, it is also part of the researchers' job to develop, test and publicize improvements and preventive measures. Since 1990, the Institute's expressed goal has been the Good Work Environment.

This issue of *Forskning & Praktik* should provide a good idea of the Institute's cross-disciplinary approach and of the timeliness and breadth of its projects — a report from the frontiers of research.

Lars Grönkvist
Editor

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One of seven sensitive to electrical fields

More than one employee in seven was hypersensitive to electrical fields. The most common symptoms were ear-nose-throat complaints, followed by eye problems and nervous disorders. More than 80 percent reported that they were bothered by computer display screens. Next on the list was electrical equipment. Almost one in five attributed the problems to amalgam fillings.



These are the preliminary results of a survey of 731 employees at five major Swedish workplaces. The project is funded jointly by the employers and the Work Environment Fund.¹

The study is led by Professor Bengt Knave, M.D., of NIOH's Division of Neuromedicine in Solna, and is being made in collaboration with the psychiatric clinics at Huddinge and St. Görans hospitals in Stockholm, the National Institute of Radiation Protection, and the National Telecommunications Administration.

These figures are not representative of Sweden's entire working population. The companies participating in the study are doing so because their employees had complaints. But the numbers are surprisingly high, nevertheless.

The project has been designed in three stages. In the first stage, a questionnaire was used to identify employees that were hypersensitive to electrical fields and to choose controls. On the basis of the questionnaire, the scientists characterized 99 of the 731 respondents as "cases of hypersensitivity to electrical fields." A somewhat larger proportion, 15 percent, were classified as uncertain cases or "non-cases," which did not clearly belong in either the hypersensitive or the control group. These "uncertain cases" were concentrated to two

of the workplaces, where they accounted for every fourth or fifth subject.

In the second stage of the project, which is taking place in 1992, the workplaces will be surveyed for factors that may affect health and the hormone melatonin will be monitored in employees' urine. Two more questionnaires, on such factors as personality, work environment and living conditions, are also included in this stage. By comparing the hypersensitive subjects to the controls, the researchers hope to get a better picture of the reasons for the hypersensitivity.

In the third stage, the researchers will develop corrective measures: both improvements at the workplace and individual therapies and treatments for people who are hypersensitive to electrical fields.

No simple explanation

So far, scientists have not been able to supply a simple, acceptable explanation for why electricity makes people sick. The fields around a computer display screen are normally so weak that they can hardly affect a nerve cell.

Several hypotheses have been tested, but they have not been confirmed by either epidemiological studies or experiments. Researchers are increasingly of the opinion that hypersensitivity to electricity, like most

other illnesses, must be seen against a background of numerous factors, perhaps a combination of physical, chemical, technological, physiological, biological and psychosocial conditions.

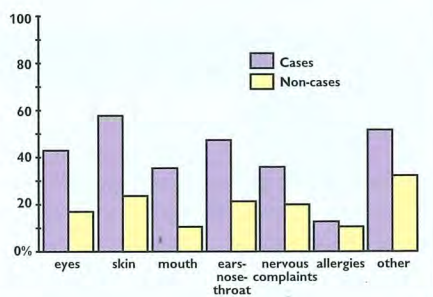
"There is no reason to assume that hypersensitivity to electrical fields should be an exception to this rule," explains Knave, and adds: "Electromagnetic fields can not be excluded from the list of conceivable explanations. The hypersensitive persons' testimony about when they feel affected, and provocation studies in which researchers have found suspected correlations with extremely weak fields, indicate that this line of research must be followed up."

The number of people who are hypersensitive to electrical fields has grown in recent years. Victims have banded together in an interest association, which now has a couple of thousand members. According to some sources, there may be 10,000 to 20,000 Swedes who are hypersensitive to electricity.

Hypersensitivity to electrical fields was initially dismissed as an exclusively Swedish ailment, but similar symptoms have since been reported in other European countries as well as the United States.

The victim's version

Hypersensitivity to electricity does not scientifically exist, since no scientist has managed to identify an objective connection between electricity and symptoms and convince the world that there really is a connection. So far, knowledge of the condition is based on the reports of the victims about the symptoms and their relationship to different environments.



Symptoms reported by employees.

The most common symptoms are skin problems and various kinds of nervous problems. Skin problems have symptoms such as irregular reddening, pinkness or redness, rashes, blushing, prickly sensations, aches, tightness, itching and sensitivity to light. Nervous symptoms include dizziness, prickly sensations, fatigue, weakness, headaches, breathing problems, perspiration, depressions, heart palpitations and forgetfulness.

Most of those who are hypersensitive experience the problems in connection with work at display terminals, but other sources can also be named: fluorescent lights or electrical wiring and machinery. The symptoms may have arisen during work at a display terminal, and then gradually become so severe that nearly all contact with electrical fields causes problems. Many hypersensitive people develop extremely serious problems and have to take extended sick leaves. In Sweden about 120 cases of occupational illness due to display terminal work are

reported annually: 30 to 40 of these cases concern hypersensitivity to electrical fields.

Six of ten allergic

People with a tendency to develop allergies may be more likely to be hypersensitive to electricity. In one group of hypersensitive workers, about six of ten were allergic to various kinds of pollen and chemical substances.

Some experimental studies support the assumption that the hypersensitivity may be partly due to changes in the pineal gland. Interest has focused on the hormone melatonin, which affects alertness. Some experiments indicate that electromagnetic fields can reduce the melatonin level in the blood, particularly when it is highest, which is normally during the latter part of the night.

Another metabolic disturbance that has attracted interest is porphyria. This disorder is due to a disturbance in the breakdown of hemoglobin. The most characteristic symptom is sensitivity to light.

"Many people who are hypersensitive to electricity are sensitive to light — so sensitive that they can't stand anything brighter than a candle," says Knave.

No therapy

Amalgam has also been proposed as a possible explanation. Victims who have had their amalgam fillings replaced have in some cases improved.

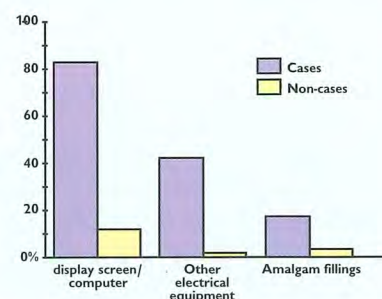
New computers have a particular odor. The circuit boards have been treated with a fire retardant, for example. Very little is known about the toxicity of these substances; in some cases almost nothing. Nobody knows anything definite about their effects on health at the low concentrations involved here.

"The symptoms are often more severe right after the employee has gotten a new machine," Knave points out.

Finally, he wishes to emphasize two other aspects: the importance of personality and of job organization. Many hypersensi-

tive persons are very conscientious, goal-oriented and highly motivated. It has been suggested that the problems may be an expression of dissatisfaction and frustration that the employee's knowledge and competence are not being sufficiently appreciated and exploited. This might explain why in some companies there are groups of hypersensitive people, while employees in other companies have no such problems.

"Hypersensitivity to electrical fields is a growing problem. At present there is no obvious solution. There is no therapy that has scientific support, and it can be a long time before one is developed," explains Knave.



More than 80 percent of the cases reported that they were bothered by computer display.

This is no reason to give up. Hypersensitive persons who have reduced the time they spend at display terminals and around other electrical equipment have been able to continue working.

"This gives us hope for the future," concludes Professor Knave. LG

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Provocation test of EMF-sensitive

A computer turns the field on and off at random. Every ten seconds, the subject has to indicate if there is an electrical or magnetic field in the room. In the first provocation study, two subjects had results that were better than random.

The provocation study is part of a larger research program on hypersensitivity to electricity, now being conducted at NIOH. Within the framework of the program, scientists are investigating factors that might lead to hypersensitivity to electricity.

"Being over-sensitive to electrical fields is an annoying condition that can be a considerable social handicap," says Professor **Arne Wennberg**, M.D., NIOH's Division of Neuromedicine. "In the worst of cases, the affected person can be forced to live in a trailer or a cabin in the woods, far from the nearest power line."

The condition includes symptoms such as rashes and skin reddening, headaches or general fatigue.

In some illnesses, such as allergies, there are two pathways for evoking a particular reaction: psychological mechanisms or chemical and physical factors.

"Some experts believe that hypersensitivity to electricity is due to purely psychological mechanisms. The affected persons usually say that the reasons for their problems are physical."

"Psychological factors are almost certainly part of the picture, but in the provocation study we are investigating whether electrical or magnetic fields are also factors which can cause problems."

New experiment

In an earlier provocation study, made initially with 14 subjects, two of the subjects had response patterns indicating that

they could determine the presence or absence of a 50-Hertz electrical field with better than random success.

"When we got results that were better than random, we wanted to do the experiment again," says Wennberg, who with **Olof Franzén**, Ph.D., NIOH's Division of Neuromedicine, and **Lars-Erik Paulsson**, Ph.D., National Institute of Radiation, carried out the new study.

In the provocation studies, the experimental subject sat in an electrically insulated room. A computer turned the field on and off at random. Every 10 seconds the subject pushed either a "yes" or "no" button, indicating whether he thought the field is on or not. The simulations were made for both magnetic and electrical fields, at frequencies of 20 kHz and 50 Hz.

In addition to repeating the first experiment exactly, with approximately the same group of subjects, the researchers also made some modifications in the test design.

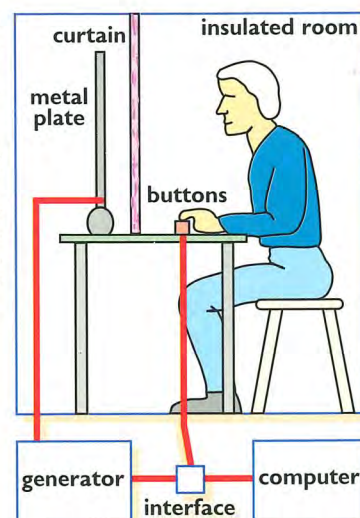
"The analysis of the tests that were made according to the old model didn't show the same tendency we found earlier in two of the subjects. Everybody was at about the same level."

But when the test conditions were changed, three subjects could give responses that were better than random. Among these three were the two who had turned in better than random responses in the first test.

All the subjects belong to an organisation for people with health problems due to

During the provocation tests, the subject sits in a room with walls containing a copper screen that blocks electrical fields. A field created by a generator is turned on and off at random by a computer.

The subject indicates whether he thinks the field is on or off by pressing a "yes" or "no" button.



electrical fields or computer display screens. The criterion for participating in the study was an immediate reaction on approach to an electrical source.

Skin temperature monitored

The scientists also have plans to extend the provocation study.

"Many of the subjects claim that their faces get warm during the experiment," says Wennberg. "We therefore plan to equip the test room with a heat camera that can measure skin temperature with an accuracy of 0.1° C."

The plan is to let the subjects sit in the chamber without knowing whether the current is on or off. During the time, the camera will register any temperature changes in their skin.

"At present, we don't know whether electromagnetic fields can be a cause of the problem we refer to as hypersensitivity to electricity. But this may very well be the case, and it would not be particularly scientific to ignore the possibility," says Wennberg. PT

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WWDU problems have many causes

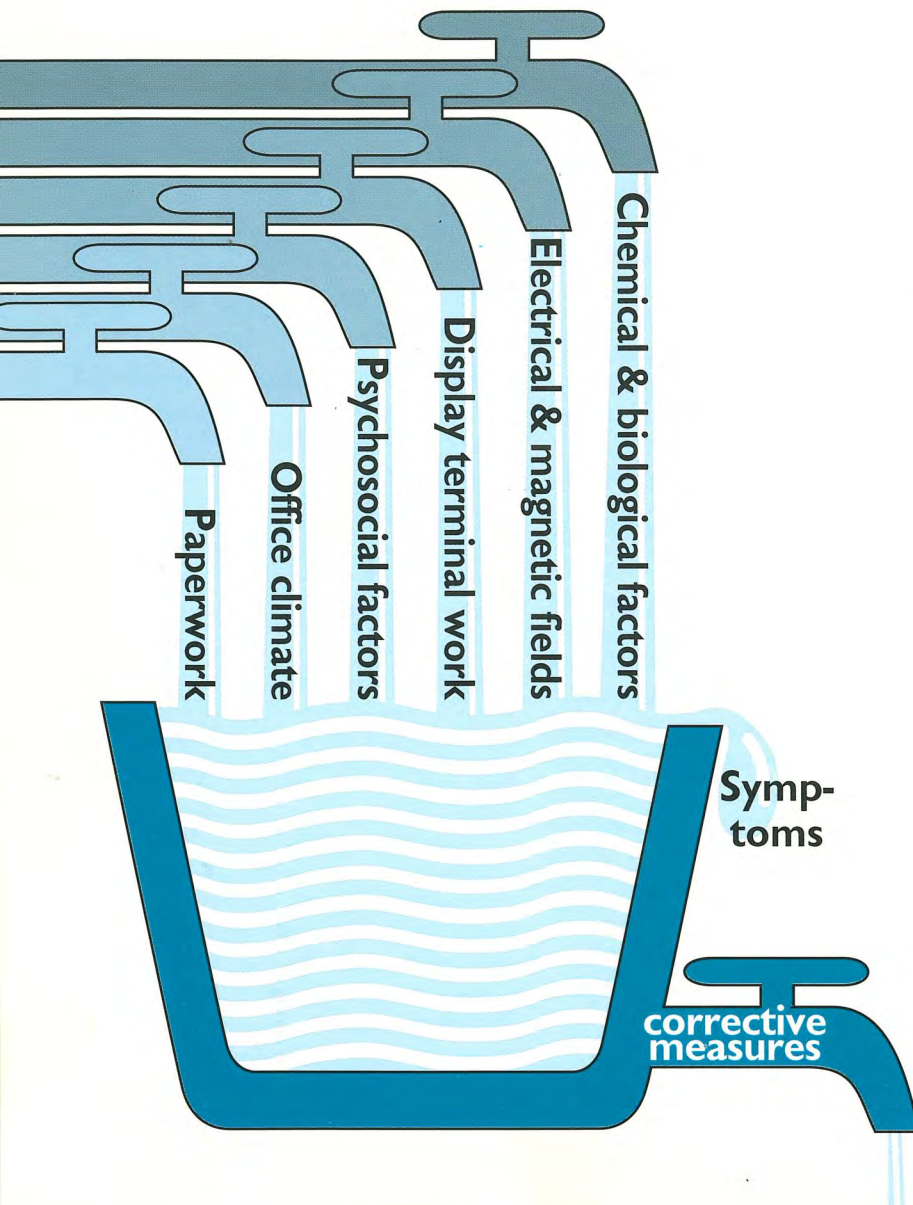
Employees in offices with high electrical background fields are more likely to have skin problems. But simply removing the fields doesn't make the problems go away.

"It's like bailing a boat with a teaspoon," says Kjell Hansson Mild, Ph.D., Division of Occupational Medicine, NIOH, one of the scientists working on a study of 6,000 office workers in northern Sweden. "There are a whole lot of other factors that have to be corrected at the same time."

Berndt Stenberg, M.D., is a dermatologist at the regional hospital in Umeå. Many patients who complain of skin problems such as rashes or dryness, which they associate with work at display terminals, are referred to him. He therefore took the initiative for the study "The Office Illness Project in Northern Sweden."

During the fall of 1988, a questionnaire was sent out to 6,000 office workers in three towns in the region: Umeå, Skellefteå and Lycksele. All the companies in the study had more than ten employees.

The questionnaire was answered by almost as many men as women, and the average age for both sexes was slightly over 40. The majority of the respondents worked in the public sector, and one in ten suffered from asthma. Among nearly 5,000 processed answers, the researchers found 3,200 persons who worked at video display



Researchers compare office work to a vat being filled with water (=various environmental factors). When the employee develops a medical symptom, the vat has run over. To get rid of the problem, the vat has to be emptied (=corrective measures at the workplace).

terminals, (VDTs) for more than one hour per day.

The questionnaire was followed by two case-referent studies. One was a study of skin problems among VDT workers, and the other a study of the "sick building" syndrome. The 600 subjects participating in these studies were also examined by a dermatologist and a nurse, who classified their complaints.

Electromagnetic fields

"From the material supplied by the questionnaires, we chose 75 of the VDT workers who frequently had skin problems and compared them with 75 who had no such problems," relates Hansson Mild. He and research engineer **Monica Sandström**, Division of Occupational Medicine, then examined 150 workplaces for such factors as electrical and magnetic fields.

Magnetic fields can be created by external factors such as nearby power lines. Inside buildings, magnetic fields are caused by such things as electrical wiring and transformers, and electrical fields are generated mostly by wiring and electrical equipment.

In measuring the strength of the fields, the scientists found they varied considerably from office to office.

"Skin problems were three times more common in offices with high electrical background fields," reports Hansson Mild.

People exposed to strong magnetic fields during work at the VDTs suffered from skin problems more often than those working at screens with low magnetic fields.

Other factors that can cause skin problems are machines and equipment in the room and fluorescent lighting with plastic or glass filters. The amount of time spent at

the terminal daily is also important. Skin problems were twice as common among those who worked at VDTs more than four hours per day.

"People who didn't like their jobs or were dissatisfied with their situation also had a greater tendency to report skin problems," says Sandström.

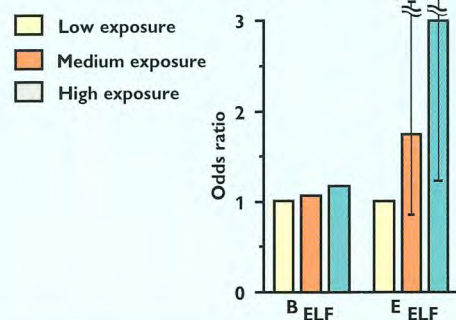
In general, women were four times more likely than men to be bothered by conditions such as heat, noise and drafts. The women in the study were more often smokers, and generally had lower positions and less office space.

The vat overflows

The project also includes independent studies of psychosocial, chemical and microbiological factors. The mass of information gathered is now being reviewed by sociologists and other scientists, who are trying to find a common ground.

The occurrence of skin problems associated with electrical and magnetic background fields of different strengths.

Background fields



"It's a question of how we are going to put the pieces together to create a picture that includes all the causes for the skin problems," says Hansson Mild.

In order to explain the situation, he compares the problem to a vat that is gradually being filled with water. Finally one more drop is added, and the vat overflows.

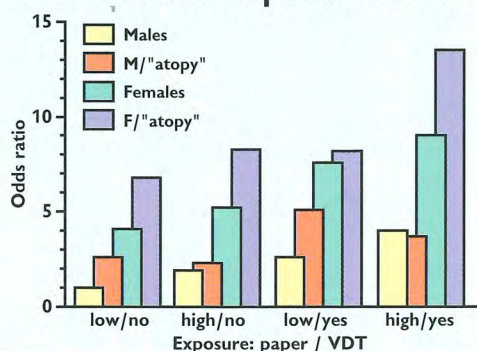
"There is no simple answer. Poor ventilation, badly organized work, a lot of paper-work and bad interpersonal relations at the workplace are all factors that can play a role."

"That's why removing the electrical fields doesn't solve much. It's like bailing a boat with a teaspoon. You have to look at the whole picture instead, and tackle several problems at the same time."

The electrical sanitation, however, may provide a way to introduce other corrective measures. PT

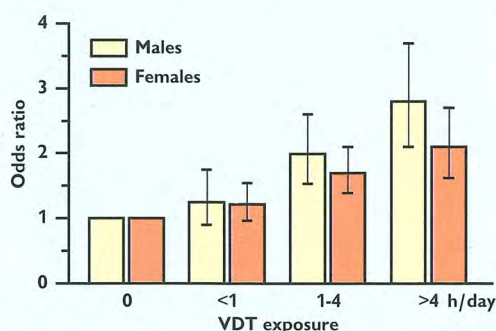
Contact: Dr. Kjell Hansson Mild,
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Tel. (+46) 90-16 50 00.

Personal and exposure factors



Exposure to paper and work at VDTs related to the occurrence of skin problems.

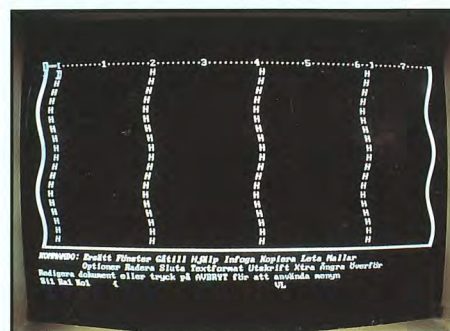
VDT work



The occurrence of skin problems related to time spent at display terminals.

Magnetic fields distort the picture

In several offices, the scientists measured external magnetic fields that were strong enough to affect the images on the display screen. Such disturbances may in the long run lead to eye irritation and headaches.



External magnetic fields in offices can disturb picture stability and make the terminal display very difficult to read.

"This may be a new sub-project that we didn't plan on in the beginning," says Sandström.

The scientists set up an experiment at the laboratory in order to study the phenomenon. They placed coils 1.8 meters in diameter around a work station with a display terminal. When current was led through the coils it created a magnetic field that distorted the image on the screen.

"We have studied magnetic fields of 50 and 60 Hertz and a range of field strengths," says Sandström.

Eight subjects sat at seven different display screens that were exposed to the external magnetic fields.

"They were instructed to say when the disturbances on the screen became noticeable, and also when the screen was so distorted that it was impossible to continue work."

The results so far indicate that the distortions are noticeable at field strengths exceeding about 0.5 μ T, although sensitivity to disturbances can vary with the kind of terminal and with the frequency of the magnetic field.

"A 60-Hz magnetic field, which is standard in the United States, disturbs the display screen at lower field strengths than 50-Hz," says Sandström.

The experiment has laid the ground for further studies of this type of disturbance and its effects on people who work at display terminals.

Women and computers for better and for worse

Data entry and data dialogue work are associated with high sick leave statistics, particularly for employees over 45. These jobs are almost exclusively the province of women.

But computerization does not necessarily make women's office jobs more monotonous. In the long run, less qualified tasks disappear, which is favorable for women.



Professor **Gunnar Aronsson**, Ph.D., of the NIOH Division of Organizational and Social Psychology in Solna, has studied the effects of computerization on job requirements and job structure in the National Swedish Telecommunications Administration, which has 40,000 employees. Professor Aronsson has also led several projects on computerization in the public sector and its effects on the physical and psychological health of the employees, job content and job satisfaction.

The effects of computerization on working conditions are often formulated in terms of "dequalification" and "polarization," or job enrichment. "Dequalification" means that computerization will create a lot of simple jobs requiring little skill and leaving no room for professional pride or individual development. The implication of "polarization" is that computerization may tend to divide the employees or widen an earlier division, a variation of the "upstairs, downstairs" theme.

"Researchers have presented contradictory or apparently contradictory results. They have observed both lowering and raising of job requirements," explains Aronsson.

The study in the telephone company is distinct from many other similar studies in that it covers eight entire years, 1977-1985. The scientists used a general Swedish job classification for civil servants.

The simplest tasks were reduced by half after the introduction of computers, and the reduction was most pronounced among women. The four categories Design, Engineering, Commercial work and Personnel administration had grown, and the higher job requirements applied in all cases to women. In Design, the simple tasks for women declined appreciably and the women in middle positions trebled, indicating that the number of female engineers increased.

Professor Aronsson summarizes the study: "The results do not indicate that computerization leads to less qualified jobs — the tendency is rather the opposite. The proportion working with the simplest tasks has diminished, which has been favorable for women."

But computerization did not lead to a more even distribution of women and men in the higher positions. Most of these are still held by men.

Nine of ten with no influence

Over 2,000 employees who regularly worked with computers in the Swedish Telecommunications Administration, the Uppsala municipal government, and the Västmanland County Council participated in a questionnaire study about their work environments and their health. The response rate was about 90 percent.



Lasse Wigur

With the help of job descriptions and the information supplied by the respondents, five different work areas were defined:

- Administration and accounting
- Technical work
- ADP work
- Laboratory assistants and nurses
- Telephone and telex operators

In general, computerization meant bad working conditions for occupational groups with repetitive jobs and intensive sessions at the terminals — telex, telephone switchboard, data entry. Fewer than one in ten of these workers reported that they had some influence over their work situation, while in other groups the proportion claiming they had some control over their work situation ranged from half up to eight in ten.

Personnel at telephone switchboards and the Directory Enquiry Service were those who felt most dominated by their equipment, while programmers and systems analysts, for example, did not consider themselves dominated by the computer. Telephone and telex operators also felt that they had poor contact with their immediate supervisors.

Work at a computer terminal often requires accuracy, concentration and endurance, and can increase psychological stress. Administrative personnel, nurses,

switchboard operators and personnel at the Directory Enquiry Service reported that computers had made their jobs more demanding and hectic. The telephone operators also said that computerization had reduced the room for variation and individual development. Service technicians, data entry operators and telex operators didn't think their job requirements had risen much.

Stress from breakdowns

Reactions to breakdowns and technical problems with the computers depend partly on what kind of computer the employee is working with. Large computers are special in this respect. Technical problems and worries about breakdowns can be extremely stressful, both immediately and over the longer term. With brief interruptions and waiting times the employees were not primarily worried about losing time or not being able to complete their tasks; it was the uncertainty about the length of the interruption that caused the most anxiety.

"Waiting times and breakdowns are therefore sources of stress rather than coffee breaks," observes Aronsson.

Salespersons, personnel at the Directory Enquiry Service and personnel who work with catalogues were much more upset by computer downtime than secretaries,

laboratory assistants or nurses. The first group had few alternative ways to do their work.

The scientists also observed how the employees handled breakdowns and waiting times — their "coping patterns" — and their effects on health. Two groups, characterized as "tense, active and helpless" and "tense, active, bad conscience and helpless," had more health problems than others. Changes in work organization that reduced the stress and increased control and social support had a positive effect for the "relaxed and effective" group, while similar measures had no positive effect on the "tense, active, bad conscience and helpless" or the "tense and passive" group.

"The trick is to find a way to organize their jobs so that it's easier for these groups to handle breakdowns and waiting times," explains Aronsson.

High-risk jobs for women

Employees with many working hours and monotonous work at the terminal had the most negative attitude towards computerization. They were more often sick and had more sick days than employees who saw advantages in the new technology.



Lasse Wigur



Lasse Wigur

Telephone and telex operators had more sick days and more illnesses than other occupational groups. Absence due to illness was lowest among highly trained administrators, personnel managers, service technicians, systems analysts and programmers. Those who worked most with computer terminals — telex operators, switchboard operators, data entry operators and personnel at the Directory Enquiry Service — were most worried about their health and also most often absent due to illness.

Workers in these job categories must be regarded as high-risk groups, and most of them are women. All the catalogue workers were women, nine of ten switchboard operators were women, and eight of ten telex operators and personnel at the Directory Enquiry Service were women.

The researchers also tried to determine the effects of job content and job organization on musculoskeletal disorders involving

the neck, shoulders and back. Data entry and retrieval increased the risk of problems with neck, shoulders and upper back. Word processing tended to cause shoulder problems.

High sick leave

Absence due to illness among 8,400 display terminal workers at the National Swedish Telecommunications Administration was studied during two years: 1985 and 1987. Employees with monotonous, repetitive jobs, such as data entry and retrieval, were absent much more often than workers with more specialized jobs such as programmer or CAD/CAM user. They were also compared to 34,000 employees, who did not work with computers.

The result from this register study agrees well with those of the questionnaire study.

Older workers tended to take longer sick leaves. The increase was also clear among workers older than 45, except for the CAD/CAM users. Women were away for longer periods than men.

Absence due to illness was also clearly higher among employees working with data entry and retrieval. These groups are clearly the most vulnerable. LG

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A summary chart of the personnel changes 1977-1985, showing the effects of computerization on job requirements and on staffing (total changes and changes for men and women) for each job category.

Job description	Total change			Change for		Change in job requirements	
	+	0	-	women	men	women	men
Jobs held mostly by men							
Design	+			↗	↗	↗	→
Engineering	+			→	↗	↗	→
R&D	0			↗	→	→	→
Management			-	↗	↘	↗	→
Jobs held mostly by women							
Sales	+			↗	↗	↗	→
Personel	+			↗	↘	↗	↗
Administration	0			↘	↗	↘	↘
Communication, library			-	↘	↗	→	→
Accounting, office services			-	↘	→	→	↗

Job enrichment – not just more tasks

Computerization creates monotonous and repetitive office jobs. But this generalization is not a universal rule. The jobs of different workers at the same workplace can vary considerably, even if the computerized part is about the same for all of them.

"Every attempt to loosen the bonds to the display terminal by combining terminal work with other tasks has to be preceded by an analysis of the character of these tasks," says Professor Gunnela Westlander of NIOH's Division of Organizational and Social Psychology in Solna.

Professor Westlander points out that attempts to introduce variation have to be thought through carefully. The employee has to feel the new combination of tasks is natural. In a project at the National Swedish Telecommunications Administration, Professor Westlander has studied ways to alternate display terminal work with other work.

"For switchboard operators, work at the switchboard was supplemented with such jobs as cleaning or watering the flowers. The question, of course, is whether the switchboard operators really experience this as job enrichment and not simply an pretext to rest their eyes," Westlander says.

Employees are often led to anticipate that new technology and "flatter" work organization will lead to jobs with greater variety, more responsibility and better opportunities to use their skills. There are a couple of excellent examples in Swedish industry, but it is doubtful that the flat models and more general skill requirements of industrial production can be transferred to office work.

"It's difficult to vary a modern office job in a meaningful way. Computerization has already redistributed tasks so that executives and managers, with the help of their word processors, have partially taken over the secretary's job," Westlander observes. She also warns against having too much faith in general models.

"Most problems can not be solved with that kind of model. Instead, it's necessary to be open to small-scale solutions, perhaps even individual solutions."

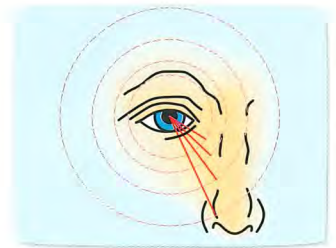
An overall view

Professor Westlander is participating in an international research project called "Musculoskeletal, Visual and Psychosocial Stress in VDT Operators in Optimized Environments" (MEPS). Psychologists working with occupational health have been concentrating on display terminal work alone, and other circumstances that affect the work atmosphere and the employees' attitudes have been neglected. The MEPS study includes a program to reduce or eliminate musculoskeletal problems, but the project is

also intended to establish criteria for how work should be organized. This means not only the work at the display terminal, but also all other work, including overtime. A research method has been developed that makes it possible to compare terminal work with both an individual employee's work situation and working conditions in general.

Participants in the study work at a display terminal for at least six hours per day, either as data entry or data dialogue operators. The relationship between terminal work and other tasks is analyzed with the help of questions such as the following:

- Does your work day contain tasks other than terminal work?
- How is your work time divided between terminal work and other tasks?
- What opportunities do the employees have for contact with their colleagues during terminal work, during other tasks, and during work as a whole?
- Which tasks contribute to job satisfaction?



Two of three data dialogue operators worked at their terminals for more than six hours per day. About half of them also had other tasks. Four of ten data entry operators at the Postal Services worked at their display terminals for a maximum of four hours per day, and the rest of the day did some other kind of work. Most workers at the Postal Services, however, sat at their terminals for six hours or more per day. Among these employees there were also many who did other kinds of jobs part of the time.

By asking questions that compare terminal work with other tasks, it is possible to determine what combinations are positive for the workers.

- How much opportunity for personal contacts do you have during terminal work and during other tasks?
- Is isolation during terminal work balanced by personal contacts during other tasks?



Chad Ehlers

- How do the psychological and physical demands of these other tasks compare with those of terminal work?
- How does work at a display terminal contribute to your overall job satisfaction, and how do your other tasks compare to terminal work in this respect?

Less stressful

Employees in different offices of the same kind, where the content of terminal work was generally the same for everyone, nevertheless had work situations that differed quite a bit. One conclusion is that some people who work at display terminals are compensated by advantages that arise in

other tasks, and vice versa. An important observation is that terminal work is regarded as less stressful than other work.

Another important thing learned in this study is that, before attempts are made to free employees from their display terminals by supplementing their terminal work with other tasks, the other tasks must be analyzed carefully.

LG

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Display terminals cause eye problems

Itching eyes and skin reddening. People who work at display terminals suffer from eye problems and skin rashes more often than other office personnel. The major reasons are bad image quality and working at the terminal for too long without a break. These findings are among the results of a ten-year study of workers at seven Stockholm companies.



Hank Morgan

The study was organized longitudinally. It was based on several questionnaires as well as medical examinations and occupational hygiene studies. In all, there were 22 researchers and assistants working in the various phases of the study, including research engineer **Roger Wibom** and project leader **Ulf Bergqvist**, M.Sci.Tech., of NIOH's Division of Neuromedicine.

The first cross-sectional study, made in 1980-1981, covered 535 persons working at seven companies in the Stockholm area; 75 percent of them worked at display terminals. In the second round of studies, made in 1987-1990, 353 of them were still working at the same jobs. The other 182 had quit, transferred to other departments or retired. The proportion that worked at terminals had increased somewhat.

Bad image quality

Display terminal workers had eye problems more frequently than other office personnel who had similar jobs but did not work with display terminals. The symptoms were smarting, itching or "scratchy eyes."

Bad image quality and working for too long without a break are two major reasons for the problems, according to the study.

"The way the text is organized plays a major role," says Bergqvist. "The spacing of the words and lines is important, as is the sharpness of the contours."

A wrongly adjusted screen background can also contribute to the eye irritation. Black text on a white background provides better visual ergonomics. The text is easier to read. This type of screen has also become increasingly common in offices.

The lighting conditions around the display screen, the occurrence of grid lines, and large variations in light intensity are also important factors.

The occurrence of eye diseases was investigated by an ophthalmologist. The researchers found no correlation between such problems and how long the subjects had been working at display terminals.

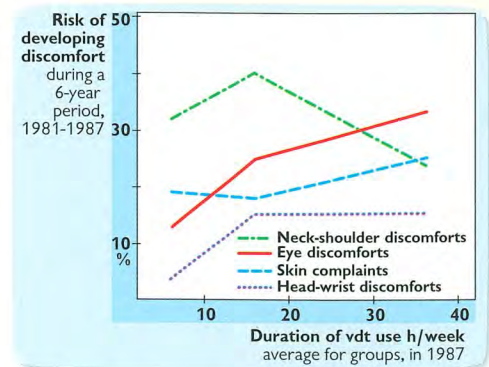
Noticeable skin reddening

Display terminal workers reported skin problems more frequently. In the second cross-sectional study, all the subjects were examined by an occupational dermatologist. The researchers found no correlation between the occurrence of skin diseases and work at display terminals, although these workers more frequently had a noticeable skin reddening.

The questionnaire responses also indicated an increased risk of skin problems for those who worked at display terminals for long sessions. This risk, however, was to some extent related to the company the person worked for.

The temperature and humidity of the air are other possible causes of the skin reddening.

"But we have not found any connection to the fields around the display terminals," says Bergqvist, "either the electrostatic, electrical or magnetic field."



A longitudinal study of VDT work and health.

"Many other occupational groups, such as some industrial workers, are exposed to higher field strengths at a network frequency of 50 Hertz. Judging by our present understanding of how electromagnetic fields affect biological material, the measured field strengths are extremely low."

Neck problems common

Neck problems are common among office workers, but the study revealed little difference here between terminal workers and other office workers.

"It's determined more by the nature of the job and its organization. Those who work with data entry and word processing, for example, are more likely to develop neck problems," says Bergqvist.

One observation that supports this conclusion is that the highest frequencies of neck problems were found in some companies which had limited display terminal work to four hours per day.

The analysis is based partly on questionnaire answers reporting neck problems, and partly on diagnoses of musculoskeletal injuries that were made by a physiotherapist.

The clearest connections between neck problems and office work were observed by the scientists with regard to questions of work organization, such as limited opportunity to take unscheduled breaks.

According to the study, the risk of developing wrist problems is somewhat greater for display terminal workers, particularly with data entry. Since relatively few workers had this sort of problem, however, the conclusion is statistically less certain.

Preventive measures

The scientists are recommending better display screens and shorter periods of work in front of them.

The workplaces for display terminal work have been improved over the ten-year period. The quality of the display is better, but there are still unnecessary reflections that may cause irritation.

"Our understanding of the importance of visual ergonomics is now good enough to allow us to start taking action," says Wibom. "We have to get the information out to the occupational health services, to the electrical and lighting consultants, and to others responsible for work environments."

Ulf Bergqvist also emphasizes the importance of including the entire office environment in future research on display terminal work.

PT

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The Institute

The National Institute of Occupational Health is Sweden's largest organization for research on occupational health and safety. It is also responsible for training of occupational health services personnel.

The Institute's multidisciplinary composition makes it possible to work on occupational health problems from several different approaches. The Institute has expert competence in the following areas:

• Chemistry • Medicine • Physiology • Psychology • Technology • Toxicology

A total of about 400 people work at the Institute, around 330 of them with research. The Institute's staff includes 27 professors.

During the 1990s the Institute is focusing on the Good Work Environment, and research is concentrating on

- Good work environments for young people
- Work after 45
- The work environment in the health care sector
- The work environment of professional drivers

Other occupational health problems that have had high priority for several years are the following:

- Musculoskeletal disorders
- Lung diseases
- Cancer and genetic damage
- Skin diseases
- Accidents
- The computer as tool
- Electromagnetic risk factors

VDU research projects at NIOH:

- **The effects of different types of pauses in VDU work.** M Hagberg and G Sundelin.
- **Stress and health in computer-mediated work – a follow-up study.** G Aronsson and G Johansson.
- **Stress and change among supervisors related to altered organization forms and new technology.** G Aronsson and P Pettersson.
- **The background of musculoskeletal work load – an ergonomic/social psychological study of the work and life situation of VDT workers.** G Westlander and H Shahnava.
- **Office work and office design – interplay and prerequisites in a work environmental perspective.** I Söderberg and G Westlander.
- **Studies of an organizational change: The work of telephonists. A model for "researchers' support in development."** G Westlander.
- **Hypersensitivity to electricity – studies on causal factors, prevention and therapy.** B Knave, A Wennberg and G Höglund.
- **VDT work and health – a longitudinal study of office employees.** U Bergqvist.
- **External power frequency magnetic field induced jitter on computer monitors.** M Sandström and K Hansson Mild.
- **The office illness project in northern Sweden. A questionnaire study of perceived health and risk on symptoms related to personal factors and occupational and residential exposure factors.** K Hansson Mild and M Sandström.



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