

New Forms of Work New Forms of Prevention

Work 4.0: Opportunities and Challenges



Imprint

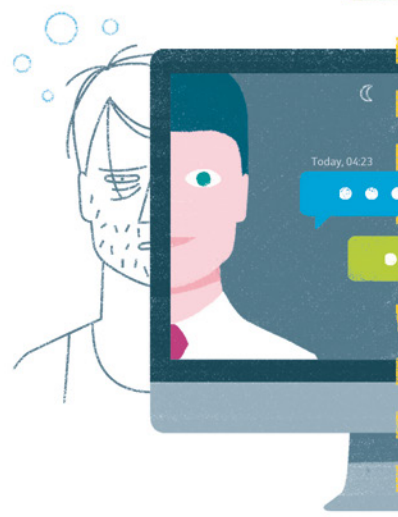
Published by:
Deutsche Gesetzliche
Unfallversicherung e. V. (DGUV)
Glinkastrasse 40
10117 Berlin, Germany

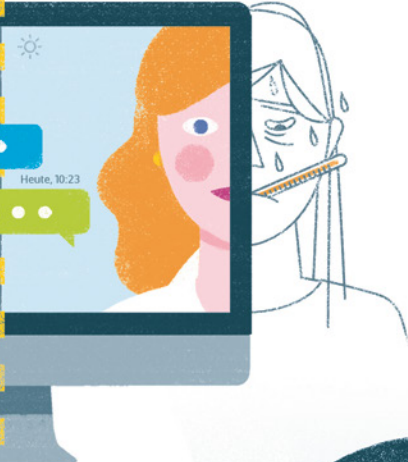
Phone: + 49 30 288763-800
Fax: +49 30 288763-808
E-mail: info@dguv.de
Internet: www.dguv.de

April 2016
Design: Raufeld Medien, www.raufeld.de
Art Direction: Lotte Rosa Buchholz
Illustrations: Karo Rigaud

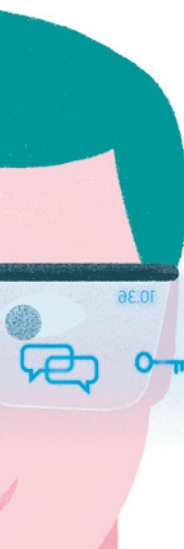
Contents

	Preface	6
1	New technologies	9
2	New spatial and temporal flexibility	21
3	New expectations for management	29
4	New diversity in forms of work	35
5	Challenges for modern occupational safety and health	41
	Selected literature	46





- | | | | |
|----|---------------|-----------------------------|--------|
| ☹️ | Baif | Die 30 besten Teststurk... | 21:54 |
| ☹️ | Schmidt Arndt | Re. Fwd. Termin verschoben | 20:03 |
| ☹️ | Pichler Max | AW: Dringend! | 19:55 |
| ☹️ | Spitzer Maria | Re. Re: Re: Re: Vorschlag | 19:41 |
| ☹️ | Schmidt Arndt | Fwd. Termin verschoben | 19:11 |
| ☹️ | Sekretariat | Schlüssel Hauptemang | 18:... |
| | Nelm Cornelia | NEUl Korrekturen Powerpoint | 17:... |
| | Helm Cornelia | Korrekturen Powerpoint | |
| | Laslo Pedro | [SPAM] Low Price Cashmere | |
| | Girod Fred | Wichtig: Bis morgen!!!!!!! | |
| | Schmidt Arndt | Termin Kurgen | |
| | Sekretariat | Drucker kaputt | |



Preface

Digitalisation, globalisation, demographic change and the increasing flexibility of work are trends that are currently shaping the world of work.

Digitalisation is particularly evident from the comprehensive networking that is possible due to the globally accessible Internet as well as the increasing use of new information and communications technologies (ICT). Innovative production systems, manufacturing processes and service processes are emerging. The term “Industry 4.0” is used when talking about the intelligent networking of people, machines, objects and ICT systems.

The limitless interweaving of economic regions is continuing to increase thanks to technical advancements in digitalisation and communication technologies. On the one hand, globalisation is increasing the amount of competitive pressure that companies are facing. This puts pressure on them to improve cost efficiencies which in turn leads to an increase in restructuring processes. On the other hand, this creates an opportunity for companies to use existing know-how to gain an edge in new markets.

The structure of Germany’s population is changing. The proportion of younger people in society is decreasing, while the number of older people is growing. This demographic change has led to fewer skilled workers being



available in the domestic labour market. It may well be that digitalisation helps to relieve this problem. Nevertheless, it is crucial to sustain the employability of workers and to permanently adapt qualifications and skills to changing needs over a person's entire working life. Furthermore, there is increased demand placed on the optimal management of heterogeneous employment structures in order to take full advantage of the workforce's potential.

The increased flexibility of work in terms of time and space has been driven by global competition and made possible by technological changes and the digitalisation of the world of work. Some types of work can and should be done independent of location and time. The border between working life and private life blurs as a result.

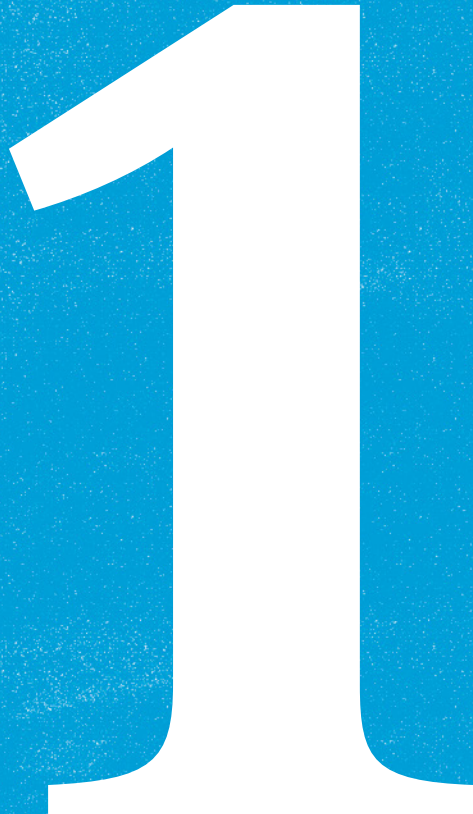
Companies are faced with the challenge of coping with these changes. Today, questions regarding feasibility and technical possibilities are still often the first to be asked. In the future, however, the main issue will be the design of good working conditions, particularly in terms of guiding performance and organising work.

The following chapters in this paper take a close look at the most important developments in the world of work resulting from the trends mentioned here. They describe the impact on workers and discuss the consequences and potential solutions for modern prevention work.

The mandate and task of the German Social Accident Insurance Institutions is to effectively adapt prevention concepts to changing forms of work and changing requirements.

This position paper of the German Social Accident Insurance Institutions is directed both internally and externally. It forms the framework for future projects in which specific action points will be recommended to companies for issues related to “new forms of work”.

*New
technologies*



New technologies

New technologies and technical developments can change existing forms of work or create new ones. The biggest driver of these changes can be seen in information technology. General digitalisation and global ICT make it possible to have dispersed production and service processes that are networked with one another around the clock.

The digitalisation of the world of work can clearly be seen in the following examples of technology:

Ambient Intelligence

Ambient intelligence refers to sensors, wireless modules and other IT components that are networked in a system which reacts by itself to the parameters of a person or their environment. This technology is being developed dynamically in the world of work. It is possible, that in the future, a person's working environment, for example, the room climate or lighting, will automatically adapt to that person's personal preferences or to the changing physiological parameters of the work being done. "Wearables" are an example of ambient intelligence. These are sensors integrated into clothing which measure physiological parameters such as body temperature and heart-rate as well as external parameters such as ambient temperature. The technology can provide an early warning of imminent danger or overstrain. Wearable technology is already being used in protective clothing for fire fighters.

Virtual Reality

Construction and development are two areas where products are often only designed using CAD¹ models. The complexity of these models ranges from simple mechanical components right through to complete industrial plants. A further level of virtual reality is reached when the working environment is no longer real but only exists as a computer-based model. Examples of this are 3D projections of work objects in real space or the projection of a simulated complete working environment, including work objects, in what is known as a “cave automatic virtual environment” (CAVE). Virtual workplaces can be set up for training purposes or to assist with developing complex plant equipment.

Augmented Reality

Augmented reality is where visual sensory input of the real world is supplemented (augmented) with virtual data. This is usually done using special glasses or a portable screen. Cameras are used to identify the user’s location and viewing angle. The objects that the person looks at are captured on screen and augmented with virtual data which gives users an extended view of real-life work objects. The potential applications of this technol-

¹ CAD = Computer-Aided Design (CAD) is the use of special computer software to create designs and documentation.

Industry 4.0

“Industry 4.0” is a somewhat controversial term which describes a new level of automation and interconnectivity. It is characterised by:

- the autonomous networking and decision-making capacity of systems
- widespread use of the Internet in production and services (“Internet of Things”)

The first industrial revolution was characterised by mechanical production systems powered by water and steam, the second revolution by mass production based on the division of labour and the help of electrical energy, the third by the use of microelectronics to control machines, and the fourth is characterised by comprehensive interconnectivity.

ogy are already quite diverse. It can help with medical diagnosis and treatment, with maintenance work, with the design and construction of products, and with steering aircraft by displaying relevant flight data.

Self-organising production systems

Despite all the technology now being used, the control of technical production processes is still based mainly on intelligent planning and programming by human experts and operators in production and logistics. In the future, this explicit control of production processes can be replaced by self-organised control. Implicitly controlled systems are already being piloted, tested and applied. Thanks to fast, wireless data transfer, integrated intelligent sensors and access to the Internet, these systems are capable of acting “independently”. “Intelligent” machines, warehouse systems, equipment and products can exchange information on their own, they trigger actions themselves and they control each other. In the vision of “Industry 4.0” or “cyber-physical systems”, workers are still partly integrated into industrial production processes but only in a supportive role or when a critical situation arises. This is not the case when “collaborative robots”, which work hand in hand with people, are part of the system.

Characteristic of the tendency to digitalise (almost) all work processes are some developments in working ac-

tivities that are based on mobile information and communication technologies:

Spatial and temporal flexibility

Notebooks, tablets and smartphones (mobile end devices) together with the increasing availability of wireless Internet connections have made it possible to remove the traditional spatial and temporal limitations of work. As long as the necessary software, apps, services and data from decentralised networks, servers and storage systems are available, then it is possible to work anywhere and anytime.

However, even existing forms of work can take on a new quality through the use of mobile ICT. Examples of this include mobile hand devices used in warehouse logistics, notebooks as diagnosis and documentation tools in machinery maintenance, or mobile terminals for drivers in transport logistics.

Chapter 2 “New spatial and temporal flexibility” addresses this subject in detail.

Mobility by proxy, remote control and virtual cooperation

A new form of work that is still in its embryonic phase is mobility by proxy. This is where an employee, who is on site, uses mobile ICT to work together with a person in a different location or to control devices over any dis-



tance. In the field of medicine, there are already examples of this: a doctor who performs an operation with the assistance of a specialist in a different location or a paramedic who receives instruction on the telephone from an emergency doctor in head office. The logical continuation of this development is to have work activities that are entirely remote-controlled; examples of this can already be found in plant and equipment maintenance.

Consequences for workers

The interaction between humans and machines has reached a new level of complexity.

- The human being becomes part of an integrated, controlled system. Thus, ceding autonomy to digital control, but at the same time having to detect errors and react to them. This applies not only to manufacturing processes but also to service processes.
- New technologies can help the creation of decent, human-friendly work. The possibilities include: shifting physically demanding work from people to self-organising production systems; physically separating workers from a hazardous environment thanks to remote-controlled systems; or self-determination of when we work, where we work, how we work and even the content of work.



Key aspects of this are:

- Relief from routine tasks: routines can be delegated to technical systems. However, people are still needed in remote-controlled and self-organising production systems, particularly in the case of malfunctions or unplanned events. A possible consequence of monitoring systems is phases of monotony coupled with the need for high levels of concentration which can suddenly be disrupted in the event of an emergency.
- Working on complex systems requires greater levels of planning, organisation and coordination which make the work being done more complicated. It is no

longer enough to simply react to signals. The way the system works has to be understood in order to make the right decisions (systematic thinking). However, this carries the risk of overload due to constant attention and concentration.

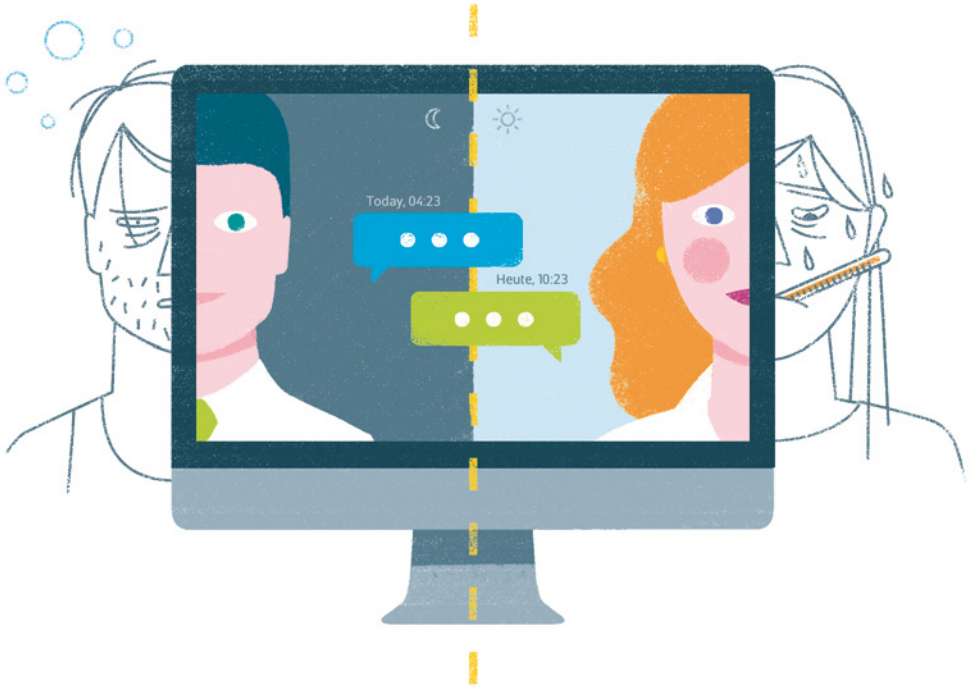
- Compensating for human differences and limitations through the use of technical and virtual systems builds language and cultural bridges and makes it easier to include workers with disabilities. However, the effect of technical errors on humans can be particularly severe, for example, if warnings are not understood or support systems fail.
- Work processes are no longer bound by rigid working hours and locations. This flexibility makes it easier to achieve work results and to maintain work-life balance, but can also lead to the blurring of boundaries between private life and working life, thus encouraging self-endangering behaviour (see Chapter 2). Self-management requires workers to have a high degree of “health literacy”.
- Virtual work processes facilitate cooperation between people who do not work in close proximity to one another. However, if communication is limited to the “digital channel” and direct sensory perception of the situation in the other location is missing, then it can be difficult to make intuitive decisions. There is a sense of detachment because there is hardly anything that is “heard, touched or felt”. Informal

feedback loops are missing, experiential knowledge and confidence are lost in unplanned situations. As a result, employees may lose sight of the implications of their own actions.

- Access to information “anywhere, anytime and in any detail” can make work easier. The timing and volume of information output is determined by what is technically possible. However, the ability of humans to process this information remains limited. Furthermore, the use of modern communication technology is often associated with increased expectations of efficiency (e.g. faster response times to customer queries), which leads to the intensification of work.
- The human-machine interface can be made safer and more ergonomic through the use of new technologies. However, this is only possible if human requirements such as attention and sensory perception are factored into product development and the design of work systems. It is no longer enough to only consider technical aspects and error tolerance as part of the human-machine interface.

Consequences for prevention

More than ever, workplace prevention must look at the work system as a whole (people, organisation, technology). Risk assessments and OSH measures cannot be limited to certain “critical control points”. During the plan-



ning phase of a work system (procedures, equipment, interfaces, etc), it is important to have the foresight to take into consideration the safety and health of employees and human needs. It is particularly important to take into account aspects of age and gender.

Due to the fact that complex, virtual work systems can rarely be altered when in operation, designing work that is human-friendly using new technologies can only be

done when the safety and health of people is included in the planning and development processes of the work system.

Accordingly, the essential aspects of prevention must be:

- An assessment of working conditions must be comprehensive, holistic and forward-thinking. This means the assessment must integrate physical and psychological aspects as well as consider technical developments.
- Prevention starts in the development phase. Prevention specialists work along with the technical developments. The result is that the use of technology or machinery is assessed in its entirety and not only in separate technical aspects.
- Under certain circumstances, the assessment criteria for new technologies need to be redefined. This includes designing a preventive analysis of the effects of errors or faulty handling on the overall result and the risk of an accident.
- In activities that are communication intensive, prevention belongs to a system of communication management where the total amount of information is reduced and only that information which is important for the task at hand are filtered through. Suitable workplace solutions must be developed which ensure there are periods of rest and recuperation.
- Prevention helps companies with the planning and conducting of training which enables employees to

safely work with technology and to assess working conditions on their own, especially outside of company premises. This can also be assisted by company guidelines with clear rules and regulations.

It is still mostly unknown which risks and hazards can arise for humans in a self-organising production system which no longer takes them into consideration or even sees them as interfering factors.

*New spatial
and temporal
flexibility*



New spatial and temporal flexibility

Spatially-flexible forms of work

Telecommuting/alternating telecommuting – working from home either completely or alternating between home and office.

Remote work – mobile workers spend much of their time on the road, either with customers or at different office locations. They are dependent on traffic conditions and the reliability of transport.

Virtual teamwork – knowledge work, in particular, is now being done across locations with changing teams who need to work together across long distances whilst avoiding the effort and costs needed to physically travel. The focus here is on results-oriented work and virtual networking.

Crowdworking – an example of flexible work

Crowdworking is an extremely flexible form of work where people are recruited via a virtual network on a needs basis. In most cases, these are self-employed people who compete globally. Payment is per project and is made only after the

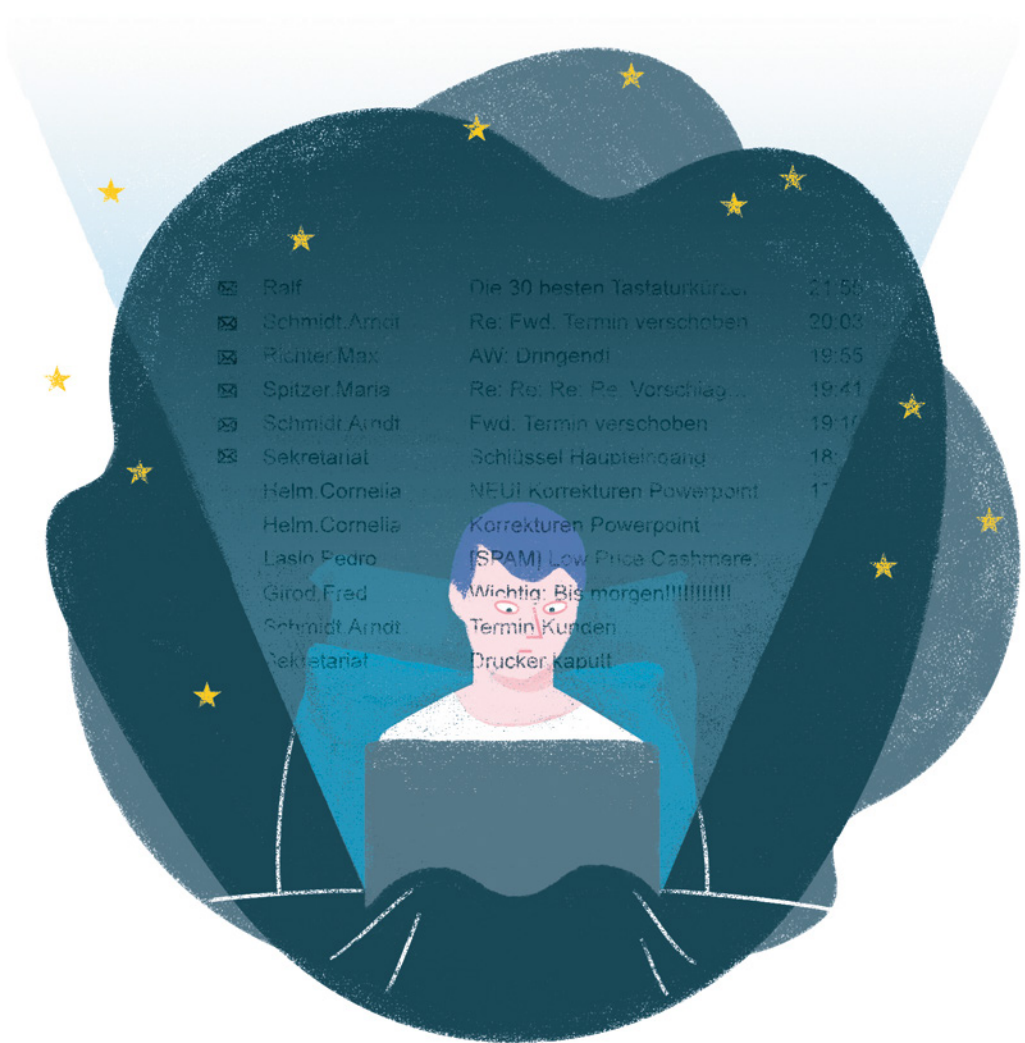
Modern ICT makes it possible for production processes to have new spatial-temporal structures and leads to new forms of work that are not only dynamic and complex but also demand a high level of flexibility from workers.

Spatial flexibility

Whether in logistics, technical services or customer support, more and more work activities can be spatially distributed thanks to powerful information and communication technologies. Massive interconnectivity and advancements in communication make it possible to overcome large distances while guaranteeing a high level of communication quality and cooperation. Spatially-flexible forms of work include telecommuting, remote work and virtual teamwork whereby team members can work together on a project across different locations and even different time zones. A fundamental prerequisite for the success of spatially-flexible work is reliable access to the Internet, networks, servers and data. Other forms of work-related mobility can be divided between residential mobility (relocation, expatriation) and circular mobility (daily long-distance commuting, weekend commuting, seasonal work). ICT is not necessarily needed for these types of mobile work.

Temporal flexibility

Work that is flexible in term of working hours includes working-time accounts, fixed work schedules that work-



ers can choose from, flexitime with time recording, and trust-based working hours without mandatory time recording. The German Working Hours Act has provisions for flexible work but also specifies the maximum number of hours that can be worked per day and per week. Other forms of temporally-flexible work organisation

client has accepted the finished result. Crowdworkers can be rated by the client when they have finished their work.

include on-call duty, “on-demand” duty and split duty, where workers are only called upon during peak working hours. The common denominator of all these forms is that work is done flexibly in accordance with workload.

Consequences for workers

Greater flexibility of working hours can provide workers with the opportunity to have a better work-life balance. However, it should be kept in mind that, in practice, a flexible, self-determined way of working does not always match the amount of work that clients would like done within a specific time frame.

The most important aspects of this are:

- Spatially and temporally flexible work provides workers with a large scope for action and decision-making. For example, they can determine themselves how to divide up their work and this results in a satisfying degree of autonomy. However, under the stress of a large workload, this flexibility often leads to people working longer hours and not taking enough breaks. Recovery periods are neglected and there is the danger of permanently exceeding one’s own limits (“self-endangerment”). Especially with trust-based working hours, it is becoming more difficult to document and prove how much effort was required and how many hours were worked in order to achieve the desired result. Recent studies have shown that

excessive working hours lead to an increase in the number of work-related accidents and mental strain.

- If workers need to be available outside normal working hours, for example, in order to respond quickly to customers' requirements, it is difficult to plan reliable work hours and recovery hours. As a result, social contact and commitments suffer.
- Flexible work must be planned and requires a good level of self-organisation. The personal skills needed for this (e.g. IT and multimedia skills) are not necessarily available and training must be provided.
- Occupational mobility also requires a high degree of planning and coordination. Mobile workers often have a poor working environment in terms of ergonomics and working conditions. The opportunity to change and improve "non-stationary" working spaces outside of a company is limited.
- Working in a "virtual team" or in the field can lead to a significant feeling of isolation. The exchange of ideas and personal social contact no longer take place "across the desk" or "in the corridor" but rather requires effort to organise. There is only limited social support from colleagues, supervisors and managers. The decline in the level of cooperation and communication can only be partially compensated by the use of social media.
- Constantly adapting one's skills and qualifications in order to meet changing requirements throughout



one's working life can, in some cases, be associated with reaching or exceeding personal limits.

Flexible forms of work are associated with an increase in the scope to structure one's own work and actions but also places greater demand on personal skills and competencies in terms of planning and organising work, self-management and health-promoting behaviour.

Consequences for prevention

Modern prevention work provides concrete workplace design solutions for using digital communication technologies to create a safe and healthy environment where work has temporal and spatial flexibility. The importance of health literacy increases when workers are mobile and need to make many decisions on their own. The responsibility for occupational safety and health remains with the employer.

Advice provided to companies by the social accident insurance institutions should include the following aspects:

- The establishment of health regulations regarding the use of mobile end devices and reachability including compliance with the German Working Hours Act.
- Work contracts and tasks must be allocated to workers in such a way that longer recovery periods can be planned and it really is possible to “switch off”.
- Managers should adjust the way they communicate and provide feedback based on the changing situation. Spontaneous instruction and feedback is often no longer possible. One-on-one meetings continue to be essential and need to be well-planned in advance.
- Establishing a culture of trust can bridge temporal and spatial distances. Management systems should not result in permanent monitoring of individual workers.

- Staff selection and development should be adapted to the requirements of the work at hand. Not all workers want to, or can, work flexibly. Finding common ground between the interests of the company and workers requires negotiating the degree of flexibility and appropriate training for workers. It is important to keep individual limits in mind and to put suitable prevention measures in place in the event that these limits are exceeded.
- Concepts for designing mobile work should take into consideration the different configurations of strain depending on the type of mobility. For example, workers on the road with a high degree of autonomy tend to work longer hours and not take enough breaks, whereas telecommuters tend to suffer from social isolation and a lack of recognition for the work they do.

Accordingly, framework conditions that promote good health and safety need to be established in the form of a culture of prevention that allows people who work in a spatially and temporally flexible environment to do their job without negative consequences for their health.

*New expectations
for management*

3

New expectations for management

Methods of indirect management

- Management by objectives (MBO)
- Goal-setting meetings
- Scope to act and structure work (e.g. trust-based working hours)
- Contract-based remuneration
- Broad transparency (an individual's contribution to the company's success is clearly visible)
- Incentive schemes (e.g. performance-based remuneration, non-cash rewards, bonuses, stock options, commission)
- Internal competition via internal benchmarking
- Continuous monitoring of results using controlling and reporting processes
- Reflecting performance through feedback (e.g. customer satisfaction)

Successfully working in a flexible environment also demands flexible management and HR management tools. Two fundamental changes to management strategies should be emphasised here:

Indirect management

In objective-setting² meetings, managers and workers agree on long-term performance goals which are specified as performance indicators. Detailed instructions for daily work are no longer required. The worker takes on responsibility for processes, the use of equipment, goal achievement and the quality of results.

Long-distance management

The widespread use of communication technologies and multimedia means that communication is increasingly virtual. It is not only workers who must adapt to working arrangements that are flexible in terms of time and location; managers must also adapt to a new way of leading. When it is no longer possible to see and speak with workers on a daily basis, the relationship between manager and employee changes fundamentally. Not only do the planning and the delegation of tasks have to be adapted to these changes in working conditions but also the way managers communicate and provide feedback.

² For the purpose of this paper, objective and goal are used synonymously.

Consequences for workers

New forms of management provide workers with more flexibility in how they structure their daily work. At the same time, they are expected to increase their self-organisation, performance and efficiency. Evaluation of work is no longer made only on performance (effort) but much more on success (result).

Important aspects of this are:

- Workers have considerably more scope to act because of the reduction of detailed work instructions from their manager. The more decisions they make on their own, the greater the feeling of self-determination. At the same time, workers now have to make many decisions on their own regarding the organisation of work. This “invisible” extra performance demands a high degree of responsibility and the ability to actively structure work oneself while carrying the risk of being overloaded or overwhelmed.
- Objectives can provide workers with a challenge and spur them on. They can help set priorities and structure work. However, it is important to be aware that if goals are not flexible and realistic, the goal itself automatically gets harder to achieve (goal spiral) or external factors hinder the goal being achieved.
- Control systems and incentive schemes based on performance indicators make it possible to see the contribution being made by each individual. This

Examples of self-endangering behaviour

- Increasing and intensifying the number of hours worked (e.g. working more than 10 hours per day or not taking breaks)
- Taking substances in order to relieve tension
- Taking stimulating substances to enhance performance
- Coming to work while sick (presenteeism)
- Lowering quality
- Pretending/faking (e.g. pretending not to be overloaded and then taking on even more tasks)
- Bypassing safety and protection standards
- Ignoring services and activities to promote good health



can encourage pride in one's own achievements and increase identification with the company. Conversely, this can increase pressure to succeed. Conflicts and competitive behaviour also rise. In order to cope with these conditions in everyday work, some workers behave in a way which, over the long term, can lead to "self-endangerment".

- When managers are responsible for an increasing number of employees or there is an increase in long-distance management, there is the danger that an important source of social and professional support will dry up.

Consequences for prevention

Indirect forms of management can increase worker autonomy and encourage them to participate more; thus, indirect management has the potential to promote good health. Modern prevention work fosters and uses this potential and applies this method of organising work in order to counter possible adverse side effects.

The following aspects are at the core of the German Social Accident Insurance's advice:

- In order for objective-setting meetings to be carried out by all parties "eye to eye", appropriate training needs to be given. Objectives should be flexible and negotiable so that they can be adjusted for real-life circumstances. Unrealistic and constantly rising



“goal spirals” push workers towards self-endangering behaviour. A good manager takes into account individual skills and advises workers of suitable training opportunities.

- Restrictive operating guidelines hamper workers who are supposed to achieve agreed-upon objectives on their own. Only when these company stumbling blocks are removed, can the positive impact of having scope to decide and act take full effect (a strategy of “if you’re going to do it, do it right”).
- Feedback needs to be planned systematically when employees and managers are spatially separated and performance is to be evaluated in terms of achieving objectives. Managers need to be aware of their changed role and receive appropriate training.
- Traditional behavioural prevention (time management, stress management) is seen as an obstacle to



achieving goals and cannot solve the problems associated with self-endangerment. It is more effective to improve confidential communication and to establish a reliable early warning system.

- Health indicators must have equal weighting with performance indicators in the company's statistics. Managers are responsible for instructing their employees how to improve their self-care skills. Ensuring that all workers are fit to work is a key element of a sustainable human resources policy and should be represented in the company's key performance indicators.
- Ultimately, it is a company's culture, and not the individual managers, that decides whether healthy behaviour "pays off". Knowing what we know about the risks of self-endangering behaviour, it is vital for every company to cultivate a culture of prevention in which the effects of work actions are reflected on health and appropriate measures are put in place. Moderated, mixed-age work groups have shown a lot of promise, because they not only enable the transfer of knowledge but also the transfer of social and emotional skills.

In prevention, it is important that management create processes and conditions which do not lead to contradictory behaviour or hazards in the workforce. Creating suitable alternative ways of acting is also a possible prevention measure.

*New diversity
in forms of work*

44

New diversity in forms of work

Examples of new diversity in forms of work

Crowdsourcing – Companies use online platforms to contract out work. Large projects are often broken down into smaller work packages which job seekers then apply for.

Casual employment – This refers to a form of employment where workers do not have contractual entitlement to specific regular working hours, for example, seasonal workers or on-demand workers.

Employee sharing – A worker is jointly employed by several companies. Examples of this include different companies creating a pool of workers they share or companies “loaning out” workers during slow periods to other companies.

Portfolio working – This refers to a situation where a person works for several companies at the same time on a contract basis and is usually done with smaller contracts.

The proportion of atypical work has increased significantly and is now part of the working life of approximately one in five people in the “core workforce”³ (Datenreport, 2013). Only when the following criteria are met can we speak of “normal” working conditions: full time, permanent employment; integration in the social security system; and employment by the same company where one works⁴. This contrasts with atypical employment which occurs when one of these criteria is not fulfilled. This includes people who work part-time, have a limited contract, do temp work or have “mini jobs”⁵. In addition, there is an increasing number of people who are self-employed and who do not have a regular employment contract. For these people, a “contract for work and services” is particularly important. Companies are increasingly using Internet platforms to offer project work to freelancers (see Chapter 2).

Consequences for employees

Work is becoming increasingly heterogeneous. For a significant portion of the workforce, this means that working hours, working locations and companies are constantly changing. Worker profiles and histories are becoming more diverse.

Some forms of atypical employment can benefit workers, for example, if part-time employment enables a person to have a better work-life balance. However, atypical employ-

ment frequently results in deviations from usual working standards in terms of working hours, remuneration or job security. This can lead to psychological stress and strain.

Many atypical forms of employment bring with them specific work-related stressors⁶:

- The stress of staying employed and the pressure to find new work.
- The stress of being constantly monitored. Contract workers and temp workers have to constantly prove that they are doing a good job and it is worth keeping them employed.
- The challenge of being employed by several companies at the same time and the time-management problems that are associated with this.
- Uncertainty regarding how long the current work will last and whether they will be employed in the future.
- Uncertainty because of frequently changing work environments, for example, temp workers have to understand safety regulations at frequently changing work locations.

³ In Germany, the core workforce is defined as all people aged 15 to 64, excluding those in education, in the armed forces, in military service or civil service.

⁴ = not a temporary worker

⁵ In Germany, a "mini job" is for a limited period of time and up to €450 tax-free per month.

⁶ Stressors are factors which can lead to the increased likelihood of a stress experience. Stressors can have a negative effect on health and well-being.

Solo self-employment/freelance – A self-employed person without any employees who offers their services to companies for projects of varying duration.

Underlying all of these forms of employment is the basic principle of flexibility.

Source: Eurofound (2015). New forms of employment. Publications Office of the European Union, Luxembourg.





- The feeling of isolation due to a lack of social contact and support from colleagues and supervisors.

The temporal and spatial flexibility that is demanded by these new forms of employment together with an inability to adequately plan can increase the amount of stress experienced by workers, regardless of the actual work being done. This not only entails risks for individual performance but also their safety and health.



Consequences for prevention

In the future, it can be assumed that a significant proportion of work will be limited, in project form and results-oriented. In practice, this trend of diversified working arrangements means that people working in the same company, the same department, the same workplace and who are doing the same work will be remunerated differently and have different levels of social security. OSH specialists must focus on the effects of this development:

- Who takes on responsibility for the safety and health of a person who works for several companies or is employed by a subcontractor? How can a company ensure that all workers behave in a safe way, even if they are on the road or work on a contract basis? This responsibility must not be delegated to the workers themselves.
- How can you communicate with workers regarding workplace health promotion if they don't work on



the company's premises and are difficult to reach? How can health and safety briefings be adapted to the needs of people in flexible and atypical employment? This requires innovative approaches such as the use of modern communication or health promotion services as part of cross-company business networks.

- When different forms of employment are combined, stressors can accumulate and quickly reach a critical level. In order to develop effective prevention measures, companies and accident insurance institutions, together with workers, are faced with the challenge of obtaining a realistic picture of the entire situation and the stressors involved.
- From the knowledge we have of work-related stressors, we can see what needs to be done for effective





prevention work and provide companies with concrete recommendations during consultation.

- In order to grow old and stay healthy in atypical employment, it is important to not only look at technical and ergonomic aspects of work design but also to consider how work is organised, how people are deployed, the culture of prevention, training, working hours and personal attitudes towards work. Workers need help with planning their individual work paths and careers.

In these new forms of employment, there will be stress factors that result from the framework conditions of the form of employment itself and which go beyond the specific task or even company. Modern prevention work should keep these factors in mind and develop appropriate customised approaches.

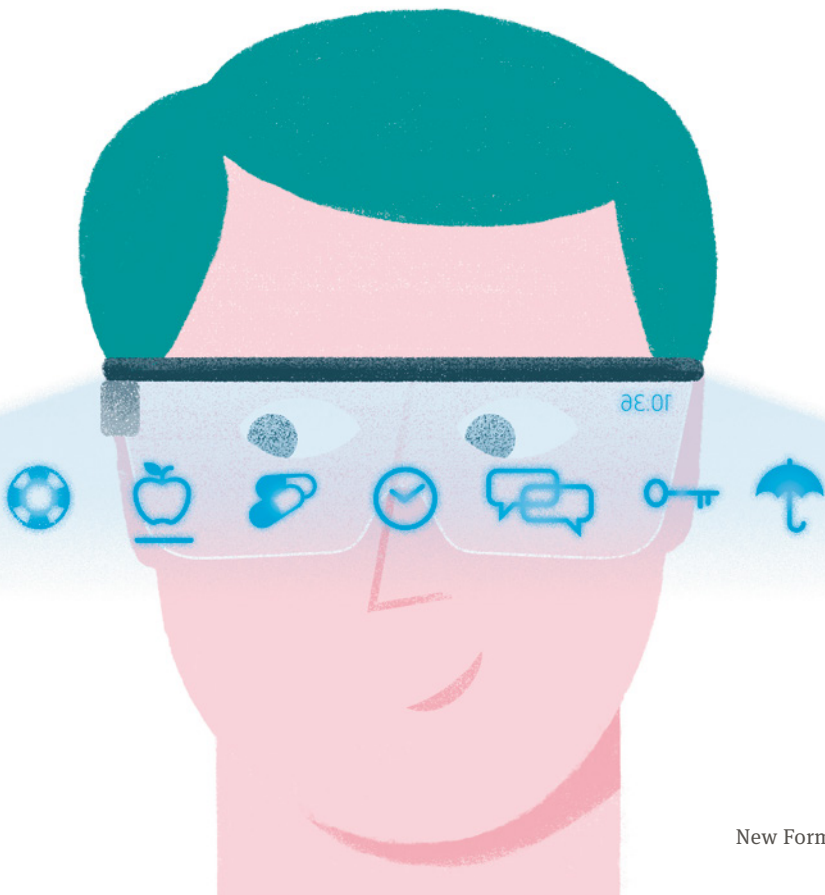


*Challenges for
modern occupational
safety and health*

5

Challenges for modern occupational safety and health

Work 4.0 requires Prevention 4.0. The current technical and social developments in the world of work are placing new demands on how we design and structure work.



The accident insurance institutions are challenged with providing prevention services and finding access channels that address these changing conditions.

Prevention must find answers to the following questions:

- How can these changes in technology and the organisation of work be shaped so that they are “human-friendly”?
- What does OSH for mobile and flexible work have to look like in order to keep people healthy?
- How can the same level of OSH be achieved for all workers regardless of their form of employment?
- How does company management have to design and structure future management and control processes in order to fulfil their responsibilities regarding safety and health?
- Which communication channels to address workers look promising?
- How can the social accident insurance institutions continue to develop their prevention concepts so that they are still effective in a digital, high-tech and flexible world of work?

The following principles are future-oriented:

- 1 Work design must be done prospectively. If it is no longer possible to directly intervene in production processes “by hand” and humans mainly have a

controlling function, then the safe and healthy design of machines lies with the development department. Well-functioning OSH must increasingly be done as part of primary prevention in a cooperation between product developers, network designers and production planners. Only then can OSH effectively prevent accidents and health hazards in a digitalised world of work.

- 2 A risk assessment that only considers individual aspects is ineffective in the digital world of work. A holistic risk assessment, on the other hand, considers all relevant risk factors and their interactions. Thus, it is a tool that allows companies to initiate a process of continuous improvement as well as develop and implement solutions that are company-specific and flexible.
- 3 Companies must not leave mobile and autonomous workers on their own. According to the German Occupational Safety Act, companies are responsible for the safety and health of their employees. It is more important than ever, that management actively structure framework conditions in such a way that they promote safety and health at work.
- 4 Companies also have a responsibility to improve the health literacy of their employees. This means enabling them, if necessary, to design healthy working

conditions themselves. This is particularly relevant when the company has no direct access to the worker and their environment.

- 5 A well-established culture of prevention in a company is the foundation for achieving these objectives. A sustainable culture of prevention can be seen when workers themselves place an intrinsic value on safe and healthy actions and behaviour. This is the only way for work in the future to be humanely designed and the digitalisation of work to be successfully implemented.
- 6 “Prevention 4.0” services are mobile, flexible and networked, only then can companies and workers be effectively addressed.
- 7 The aim of monitoring and consulting by the German Social Accident Insurance Institutions should be to improve the ability and willingness of companies to establish a good culture of prevention and thus their ability to self-analyse and adapt to new demands and requirements.

Selected literature

Brenscheidt, F., Lange Arbeitszeiten – Mehr Fehler und höheres Unfallrisiko, *baua: Aktuell*, 3/2015.

Bretschneider-Hagemes, M., Mobile IT-gestützte Arbeit, sicher ist sicher – Arbeitsschutz aktuell, 65, Nr. 7/8, S. 370–376, 2014.

Eichhorst, W., Marx, P. & Thode, E., Atypische Beschäftigung und Niedriglohnarbeit, Bertelsmann Stiftung, Gütersloh, 2010.

Eichhorst, W., Buhlmann, F., Die Zukunft der Arbeit und der Wandel der Arbeitswelt. IZA Standpunkte Nr. 77, Forschungsinstitut zur Zukunft der Arbeit, Bonn, 2015.

Hirsch-Kreinsen, H., Ittermann, P., Niehaus, J. (Hrsg.), Digitalisierung industrieller Arbeit, Nomos Verlagsgesellschaft, Baden-Baden, 2015.

Hofmann, J., Zukunftsmodelle der Arbeit. In: Badura, B. et al. (Hrsg.), Fehlzeiten-Report 2012. Gesundheit in der flexiblen Arbeitswelt: Chancen nutzen – Risiken minimieren, S. 89–95, Springer Verlag, Berlin, 2012.

Krause, A., Berset, M., Peters, K., Interessierte Selbstgefährdung – von der direkten zur indirekten Steuerung, *Arbeitsmed Sozialmed Umweltmed*, 50(3), S. 164–170, 2015.

Kratzer, N., Dunkel, W., Neue Steuerungsformen bei Dienstleistungsarbeit – Folgen für Arbeit und Gesundheit. In Junghanns, G., Morschhäuser, M. (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin) (Hrsg.), Immer schneller, immer mehr. Psychische Belastung bei Wissens- und Dienstleistungsarbeit, S. 41–62, Springer Fachmedien, Wiesbaden, 2013.

Paridon, H., Berufsbedingte Mobilität. In: Badura, B. et al. (Hrsg.), Fehlzeiten-Report 2012. Gesundheit in der flexiblen Arbeitswelt: Chancen nutzen – Risiken minimieren, S. 79–88, Springer Verlag, Berlin, 2012.

Vahle-Hinz, T., Kirschner, K., Thomson, M., Employment-Related Demands and Resources – New Ways of Researching Stress in Flexible Work Arrangements, Management Revue, 24(3), S. 199–221, 2013.

**Deutsche Gesetzliche
Unfallversicherung e. V. (DGUV)**

Glinkastrasse 40
10117 Berlin, Germany

Phone: + 49 30 288763-800

Fax: +49 30 288763-808

E-mail: info@dguv.de

Internet: www.dguv.de

