

National supervision 2012,
Ergonomics in women's work
environment

Report 2013:7 ENG



National supervision 2012, Ergonomics in women's work environment

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Summary

In the autumn of 2012 and the beginning of 2013, The Swedish Work Environment Authority carried out a national supervisory activity where we inspected workplaces where manual or repetitive work occurs. Examples of such work are lifting, carrying, pushing, pulling or repetitive movements where goods, devices and/or tools are handled manually.

The inspection was a part of the Work Environment Authority's assignment regarding women's work environment. Our lodestar has been that one should be able to carry out one's job without jeopardising health or quality of life. A person who, for example, has to do lifting every day and suddenly acquires a back injury can suffer for the rest of their life and may never be able to return to work.

Injuries that develop gradually are difficult to detect. Often focus lies on incidents and accidents. We wished to, by means of this inspection, contribute to the long-term reduction of musculoskeletal disorders (MSDs) through revealing the risks today – before the injuries arise. We want to give employers the tools to, themselves or with help of occupational health and safety services, find today's risks to avoid tomorrow's injuries.

A new method for risk assessment for musculoskeletal disorders (MSDs) involving light manual work was tested. We also used earlier established methods for assessing risks with heavy manual work. The results show that the question is an urgent one.

Of the 717 companies and organisations that the Work Environment Authorities inspectors visited, only three of ten did not have to fix shortcomings in their work environment, which shows that this type of effort is required and needed. Employers were, for the most part, positive to the question of risk assessment for musculoskeletal disorders (MSDs) being highlighted, and many have worked further with the assessment of risks and measures in a very good way.

Background and problem description

In 2011, the Work Environment Authority was tasked by the government to develop and implement special efforts with the purpose of preventing women

from being knocked out of the workplace because of problems relating to their work environment. The focus is on prevention of musculoskeletal disorders (MSDs) due to improper workload, and the campaign encompasses knowledge acquirement, information, the education of inspectors, and the implementation of national supervisory activities. The result of the activities will be integrated into the ordinary activities of the Work Environment Authority after the assignment finishes in 2014.

A person who often carries out heavy or repetitive work can suddenly incur an injury with the result being life-long ill health. A good work environment is therefore an important factor for more people to have the possibility of working longer and without risks to their health.

Women make up a larger proportion of absence due to illness than men, and have in total a rate of ill health that is 45 per cent higher than that of men. There are also more women than men who are forced to end their working life early for health reasons. For them it can mean a lower pension and an insecure old age as a result of a higher rate of illness and worse economic relations.

Musculoskeletal ailments due to heavy work tasks, monotonous movements at work, and awkward working positions are, together with psychological illness, responsible for a large proportion of work related ill health and absence from work due to illness. Among both men and women, musculoskeletal disorders (MSDs) dominate among work related illnesses. There is also a correlation between physical, psychosocial and organisational risk factors at work. Psychosocial work environment problems can manifest themselves and/or amplify muscle discomfort and other activity-related disorders.

Direction and goals

The purpose of the inspection was that it would lead to increased knowledge about ergonomics in women's work environment within the sectors which were visited, and contribute to the introduction of useable methods for, in the supervisory work, highlighting risks for musculoskeletal disorders (MSDs). Special focus was given to the assessment of risks for musculoskeletal disorders (MSDs) in the hand, arm and back while doing repetitive jobs and manual work. Female assembly line workers in industry have, in comparison with men

in the industry, a higher relative frequency of work related musculoskeletal disorders.

Repetitive work means that one repeats similar work motions over and over. Often with a high work tempo. That which one is handling does not need to weigh very much at all. Women are overrepresented in the monotonous, repetitive types of work where the risks of problems in the muscles and joints are significant. Women are thought to more often stay in these types of jobs while men move on to other working tasks.

Just the weight of the arms can be enough to strain muscles and joints in an adverse way. Repetitive work can lead to problems in muscles, tendons and joints just as much as heavy work. The injuries develop gradually and take a long time to heal.

More employers should, after the supervisory effort, know about the risks for repetitive musculoskeletal disorders to which employees in the operation are subjected, and therefore be able to work systematically with improvement of the work environment. More employers should also know about methods which reveal the risks for musculoskeletal disorders (MSDs) in workplaces where both men and women work.

The supervisory effort is expected to have positive effects on women's as well as men's work environments. An example of this can be that handheld machinery and tools should suit both men and women with regard to hand size and physical strength.

The goal of the inspection was that employers, to a great extent, should work preventively so that both the heavy and the repetitive work are reduced at the workplaces within the sectors upon which we focused.

Limitations

The inspections were carried out during autumn 2012 and in January 2013 within the sectors where we knew that risks for musculoskeletal disorders (MSDs) existed.

We chose to inspect workplaces where manual load handling or repetitive work is performed and where both men and women were employed. In 2012's

inspection, we chose to inspect sectors where men handle goods, devices, or tools as opposed to working with people or animals. Examples of sectors were: the food industry, the manufacturing industry, the vehicle industry, painters, the wholesale industry, laundries, hotel cleaning and the maintenance of green spaces.

Cooperation

Cooperation has taken place with the reference group which was specially assembled for the entire programme 'Women's Work Environment' and which consists of representatives of the parties on the labour market. The following groups are included in the reference group: SACO (The Swedish Confederation of Professional Associations), LO (The Swedish Trade Union Confederation), TCO (The Confederation of Professional Employees), The Confederation of Swedish Enterprise, The Swedish Association of Local Authorities and Regions (SALAR), The Social Insurance Agency, The Swedish Research Council for Health, Working Life and Welfare, Swedish Association of Occupational Health and Safety, The Equality Ombudsman, Unionen, The Swedish Agency for Government Employers, The Gender Equality Delegation, Employees in Municipalities and County Councils, and The Karolinska Institute.

Procedure

During this supervisory activity we used three different methods to estimate risks for musculoskeletal disorders (MSDs) with repetitive work (Hand Arm Risk Assessment Method - HARM) and manual load handling (ADI 627 and 668 "Assess risks with manual load handling" Key Item Method - KIM 1 and KIM 2).

Because an important purpose of 2012's supervisory effort was that the work environment inspectors would test and The Work Environment Authority probably introduce new practical methods to highlight the risks for musculoskeletal disorders (MSDs), sectors were primarily chosen where goods, devices and/or tools were handled manually.

"HARM and KIM are so concrete. I have used both. It has been good to be able to adjust which method I use depending on the situation. If it is primarily heavy lifting I use KIM, and if it is about repetitive work, I take HARM."

(Julia Thonérfelth, inspector, Umeå)

The companies were notified about the inspections a number of weeks in advance and the material that was used during the inspections were sent as an enclosure.

Some employers embraced this and started using the methods even before the inspection. Some of them, even at this early stage, took help of the Swedish Association of Occupational Health and Safety. Others thought that the methods looked difficult and preferred to wait until the inspectors came.

During the inspections, the inspectors carried out, together with the employer and safety representative, an assessment of the risks for musculoskeletal disorders during a working moment which one either agreed upon around a meeting table, or which the safety representative and employer came to an agreement about before the inspection. The assessment was good background data to describe shortcomings for further work in the prevention of musculoskeletal disorders (MSDs).

The assessment was preceded by a dialogue about systematic work environment, current information about work related injuries and absence from the workplace due to illness. Reasoning was also carried out about how the situation looked for men and women at the workplace.

Examples of questions that could be brought up:

- Do women and men hold the same positions?
- If women and men have the same positions – do they have the same working tasks?
- Which preconditions do men and women have at the workplace to be able to work with the same things? For example knowledge, guidance and trainee period.
- Are the tools at the workplace adapted for both men and women?

"I was at a manufacturing company in Strängnäs where they manufacture small instruments. It was a positive and fun inspection. I started talking about KIM and HARM. They listened and nodded and I could feel that I had reached them. I carried on as usual.... but then they suddenly brought out a pile of paper and showed me. I was so unbelievably surprised! It turned out that they had worked with the material themselves. Everything was filled in. It opened up for an understanding as to why

repetitive work is not good and why work rotation is necessary. It was a wonderful visit!" (Pierre Gustafson, inspector, Eskilstuna)

"The KIM method is a good starting point for dialogue. It was simple to sit down and do the risk assessment together with the guys at the painting firm. It was in black and white." (Maria Höcke, inspector, Göteborg)

Result of the inspections

Of the 717 companies and organisations that The Work Environment Authority visited, there were only three of ten that were not given demands to take measures for health and safety management. Two thirds of the cases are closed and nine notification of considered injunction have been written.

The three most common descriptions of shortcomings were:

1. You have not sufficiently investigated the working conditions in your organisation and assessed risks with focus on ergonomics for the prevention of musculoskeletal disorders (MSDs).

This is about the companies making written investigations and risk assessments from the provisions about ergonomics for the prevention of musculoskeletal disorders (AFS 2012:2).

Important factors to take into consideration in the assessments:

- The number of lifts per working day
- The weight and grip-ability
- The distribution of working moments over the work day
- Breaks, recess
- Working positions and working movements during the different work moments (for example, work height, possibility of variation, kneeling, space for movement, inner/outer work area, bending, twisting and stretching)
- Stress and work pace
- Possibility of work rotation among others
- Experienced discomfort and registered absence due to illness with strain as a cause.
- Climate

2. The Work Environment Authority assesses that your employees have not received sufficient knowledge in order to carry out their work in a way that the risk for physical overload is minimised.

It is important that the employees have the knowledge about which risks for musculoskeletal illnesses exist in their work and what they should do to minimise the risk of bringing strain related illnesses upon themselves.

3. The risk assessment which we did with the help of the assessment model Hand Arm Risk Assessment Method (HARM)/Key Item Method (KIM, ADI 627, 628) (delete where not applicable), showed that work with the following working tasks

.....

contains risk for physical overloading of among others (body part)..... for the employees who work with this.

This is because the inspector at the time of the inspection made an assessment of risk for musculoskeletal disorder (MSD) at the chosen workplace. Together with the employer and safety representative, they went through the risk assessment to see if there was some particular part of the scrutinised working tasks that created a risk for a musculoskeletal disorder. It could, for example be that the time during which the working moment was carried out was too long or that the load was too heavy to move manually.

" I inspected a company in the electronics sector where repetitive work occurred during assembly, and heavy lifting occurred during final production. Those responsible at the company were quite involved in work environment questions but had not done especially much over the recent years. I started with introductory information and together we did risk assessment of two different work moments.

The one work moment involves heavy lifting and I therefore did a risk assessment with the KIM method because the work moment exclusively involved these lifts. The other work moment was in assembly and there I used the HARM method to see if the repetitive work was harmful. Both risk assessments showed that there was risk of overloading.

In addition to fixing the musculoskeletal ergonomic risks for both the assembly and lift work moments, the company was also required to take steps to improve the employees'

knowledge and look over the cooperation with the safety representative. The demands were made in November and in March it was time for another visit.

One measure that had been introduced was work rotation. They had shortened shifts in order to break the monotony. They had also worked with attitudes at the company. Earlier there had been a clear perception about how the work should be organised, that the expensive machines had to work all the time. Now the production demands had been reduced and the insight that the machines did not need to go full speed had grown. It was okay to slow down. The CEO and safety representative had begun with cooperation meetings, which made it possible for them to catch issues quickly. They had implemented safety briefings. The company had also replaced a work situation that involved heavy lifting with lifting equipment. They had succeeded in doing so unbelievably much in just a few months. They were positive to the methods and are continuing to work further themselves with other working moments. They are prioritising their resources and taking steps. Unbelievably interesting.

I feel that we are putting into motion processes in both the short and long term. We have drawn their attention to the worst moments and sown the seeds for them to continue the work themselves. We are leaving them with something concrete with which to work further. ” (Julia Thonérfelth, inspector, Umeå)

Effects of the inspections

During our follow-up inspections we have seen that many employers have taken steps to improve work environment with focus on ergonomics for the prevention of musculoskeletal disorders.

”To offer employers and safety representatives different methods for assessing risks for musculoskeletal disorders has worked fantastically pedagogically and contributed to the employers having an understanding for ergonomics for the prevention of musculoskeletal disorders. The methods also give space for how they can actively work with the correct measures because it is clear which measure generates the highest number of points. The employers and safety representatives have really been thankful for the authority demonstrating different methods which facilitate the assessment of risks for musculoskeletal disorders” (Birgitta Sivnert, inspector, Malmö)

An employer's experience of our inspections:

"We feel it is not ok that someone injures themselves at work"

AQ Segerström & Svensson offer sheet metal components to clients who produce trucks, cars and trains, among other things. The factory is in Eskilstuna. Just over 200 people work with preparing the sheet metal: pressing, welding, surfacing and assembling. It is a noisy environment where work is carried out at high tempo. The quality demands from the customers are high.

Richard Miles is the production manager and was well versed in work environment questions, even before The Work Environment Authority inspected the workplace during autumn 2012. The work in the factory is both heavy and repetitive which, among the staff, mainly causes problems with musculoskeletal disorders in the wrists and arms.

When The Work Environment Authority's inspector was on site, Richard Miles saw the opportunity to investigate the risk of future injuries to those who work with painting.

To paint sheet metal was – before The Work Environment Authority's visit – a very repetitive task that was carried out in an uncomfortable working position.

On the day of the inspection, Anna* was working with painting – a process where one works two and two in a team of eight.

The working moment itself means that Anna works with hand and arm movements from under knee height to cover the underneath of the sheet metal with paint, and thereafter she lifts the same arm to above shoulder height with the purpose of covering the upper part of the metal. The working movement is repeated over and over until the entire sheet is covered by paint, from left to right. This means that Anna's wrist moves more than 60 times per minute, eight hours a day.

Just as Richard Miles suspected, the HARM method, which was used to assess repetitive working tasks, showed a clear risk for future injuries. Now it was there on paper, in black and white.

Continuous improvements

AQ Segerström & Svensson has now solved the problem and invested in an automated process. A whole 60 per cent of the painting will be done

automatically via a computerised guidance system. The only things Anna needs to paint by hand are those patches missed by the guidance system. This means that she moves her wrist far less when she just paints things that need improvement.

The staff is happy. The management is happy. But AQ Segerström and Svensson are not satisfied with just this improvement. They have taken help of occupational health and safety services and mapped all processes in the factory with the help of the HARM and KIM methods. They are far from being finished but have now set their sights on continual improvements.

- We feel that it is not okay that someone injures themselves at work, says Richard Miles.

Another process is in progress to automate with the purpose of avoiding heavy lifting and also to introduce more rotation.

- We have learned thoughts that we did not have before. To think rotation with the aim of using different muscle groups.

*Anna is a fictitious name. The person in question is called something else.

The Work Environment Authority has, with this effort, had the possibility of testing and implementing a new method in Sweden (HARM) to assess the risk for MSDs as a result of repetitive work. Because HARM has worked so well during our inspections we have chosen to put it on our website (www.av.se) as a checklist for employers to use.

The HARM instrument is also added as one of methods taught at the university course in methods for risk assessment of physical work load situations in order to prevent musculoskeletal disorders (7,5 university credits) that is offered by The Centre for Musculoskeletal Research at Gävle University.

Occupational healthcare services have been interested. Representatives have requested education and information, mainly to improve assessment of risks due to repetitive work. The methods that we have used for the assessment of heavier manual work have been known in Sweden for a while. Several employers have requested occupational healthcare services as an expert resource.

Continued work

Follow-ups show that many companies continue working with risk assessment of physical work load situations. The process of assessing risks at workplaces has been started at companies, but measures take time and are, in most cases, still on-going.

Discussion

An assessment of risks for musculoskeletal disorders aims at the employer self-assessing the work and whether everyone can work there. The employees have different preconditions for coping with physical demands. The preconditions vary with physical and psychological strength, with body measurements, gender, age, experience, fitness, motivation and possible activity limitations. The starting point in the Work Environment Act is that a balance primarily should be created between the demands of the job and the person's preconditions through adapting the work to the person. It is important to take into consideration women's and men's different preconditions when it comes to strain and therefore their risk for ill health.

A challenge when one assesses a working task is that the result of the assessment can look good, be 'green', but if an employee rotates between several similar tasks which are assessed as 'green' during the workday, the aggregative assessment could be both yellow and sometimes even red. It can be this way when the work tasks are, for example, carried out at different machines and be assessed in isolation, but upon closer inspection involve the same movements - for example of arm and hand. It can be a pedagogical somersault to explain that the combination of several work moments which are assessed as green are assessed as red when they are carried out one after another. Occupational health and safety services can have a significant role here. It is also important that the employers take into concern in the calculations, where in the operations the employee states that they have discomfort or experience it in their body in a some way. Assessment models such as KIM and HARM can be useful as a starting point.

Who does the assessment? Occupational health and safety services have an important task in their role as an independent expert function, but the employer would be wise to increase their knowledge about the assessment of risks for

musculoskeletal disorders within the organisation and take help from experts during assessments and contexts which are little trickier.

If employees do not use the aids and resources that exist and should be used, it can be a sign that the employer does not have procedures for follow-up and evaluate compliance. The employees are to follow given instructions and the employer should enable the employees to do so.

The work environment inspectors in the supervision

All the Work Environment Authority districts have participated, as have approximately 40 per cent of all the inspectors.

The inspectors have, by contact persons in the respective districts, had the possibility to discuss and pose questions during the entire inspection drive. Each and every one has also answered a survey after the inspections and most of the follow-up visits were completed. Of the 87 inspectors who had the possibility to answer, 65 did so.

Most satisfying was:

- 81 per cent appreciated to have access to a method for the assessment of risk of MSDs during the inspections. The comments made it clear that KIM was easy to use.
- 89 per cent were well received by interested employers.
- 83 thought that the companies were worth visiting with this aim. The comments showed especially the food and manufacturing industries had been worth visiting.
- 81 per cent expressed that employers worked well or very well with measures to redesign the workplace. The comments showed that employers had taken note of the different methods for assessing risks of musculoskeletal disorders (MSDs) with or without the help of occupational health and safety services, and worked further, sometimes way further than the stated requirements.
- 78 per cent believe that we, via these efforts, have increased the number of employers who know how MSDs arise and are prevented.

The difficulties expressed by the inspectors were:

- 38 per cent felt that HARM was not a useable method. From the comments, it could be seen that it was first and foremost useful for occupational health care services and to be able to use it, it demands good knowledge of physical ergonomics, but that it can also be a pedagogical tool.
- With assessment of hotel cleaning it was not very useful to use the methods KIM or HARM. Here one could instead discuss the risks from the provisions concerning physical ergonomics (AFS 2012:2).

The Work Environment Authority's words of value that were brought out in 2011 are offensive, credible and communicative. It is interesting to relate the inspectors' experiences of the effort from these concepts. 70 per cent experience that the inspection campaign has been **offensive**. 66 per cent feel that they have enough background information to be **credible**. Just as many feel that they have received sufficient knowledge to be able to be credible. It takes time to learn to work with the material and it has been experienced to be difficult to find time to simultaneously assess movements and write results. 65 per cent of the inspectors experienced that the supervision support has been of help to be able to be **communicative** during the inspection.

Appendices

- 1 Participants in the project
- 2 The supervision in figures
- 3 Number of visits to the branch of industry
- 4 Prior notification of visit
- 5 Inspection minutes
- 6 Brief occupational injury facts

Appendix 1

Participants in the project

Overall programme leadership

Programme owner Boel Callermo, division manager inspection Dept. Mid
Coordinator of the government assignment about Women's Work Environment,
Ingrid Gidlund, Assistant head of office of Inspection Linköping District

Project Group

Project Manager Minke Wersäll, Linköping District
Partial Project Manager, Method and Knowledge Development, Minke
Werksäll, Linköping District
Partial project leader knowledge acquirement and Ruth Carlsson, Division for
Regulations and Expert support.
Partial Project Leader Supervision Kersti Lorén, Göteborg district
Project Participant Leif Häggström Nätfalk, Umeå district
Project Secretary Lola Lidén, Linköping district
Communications Officer: Helena Westlund, Division for Communication
Communication Strategist: Judit Hadnagy, Inspection Division Mid

Contact Persons in The Work Environment Districts

Luleå District: Åsa Sjöström Ross
Umeå District: Leif Häggström Nätfalk
Härnösand District: Ann-Cathrine Danielsson
Falun District: Stefan Reis
Stockholm District: Madeleine Molander
Örebro District: Ing-Marie Bjurstedt
Linköping District: Minke Wersäll
Göteborg District: Tommy Fahlander
Växjö District: Ann-Britt Gunnarsson and Johan Jiveström
Malmö District: Birgitta Sivnert

In total, 90 inspectors from the entire country have participated in the inspections.



Appendix 2

Inspection Figures

	Visited workplaces	Number of Demands
Division North	137	385
Division Mid	299	695
Division South	281	481
	717	1561

Results:

	Number	Demands
Inspection Minutes	474	1475
Inspection Messages	33	86
Notification of Considered Injunction	8	22

Appendix 3

Branch of industry	Number of visits	Number of IM/IP	Number of demands
10. Food production	176	88	285
11. Beverage production	3	1	4
12. Tobacco production	3	2	4
13. Textile goods production	25	12	31
14. Manufacturing of clothes	3	2	6
15. Manufacturing of leather, leather and skin items etc.	3	1	2
17. Manufacturing of paper and paper goods	43	22	60
20. Manufacturing of chemicals and chemical products	35	17	51
21. Manufacturing of basic pharmaceutical products and medical products.	19	10	34
22. Manufacturing of rubber and plastic goods	98	24	149
23. Manufacturing of other non-metal mineral products	37	22	48
25. Manufacturing of metal good without machines and apparatus	11	5	21
26. Manufacturing of computers, electronic good and optics	39	17	56
27. Manufacturing of electric apparatus	72	33	94
28. Manufacturing of other machines	13	7	19
29. Manufacturing of motor vehicles, - with trailers and deep loading trailers	61	29	81
30. Manufacturing of other modes of transport	21	10	32
31. Manufacturing of furniture	32	15	44
32. Other manufacturing	36	14	36
43. Specialised building and installation activities	40	17	45
45. Trade and repair of motor vehicles and motorcycles	4	1	3
46. Wholesale and supply trade with the exception of motor vehicles.	34	20	71
47. Retail with the exception of motor vehicles and motorcycles	23	11	39
49. Land transport, transport in tube systems	3	1	2
52. Warehousing and support services for transport	5	2	13
53. Post and courier activities	31	14	44
55. Hotel and boarding activities	111	52	162
56. Restaurant, catering and bar activities	15	7	14
70. Activities that are exercised by head offices, consultant services.	2	1	2
71. Architect and technical consultant activities, technical testing and analysis	2	1	3
72. Scientific research and development	1	0	0
73. Advertising and market surveying	2	1	5
81. Building maintenance, caretaking and maintenance of green spaces	22	8	34
82. Office and other company services	1	1	2
85. Education	4	1	1
86. Health and medical care	2	0	0
88. Open social efforts	3	0	0
94. Interest monitoring, religious activities	1	0	0
96. Other consumer services	52	26	88



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Page
19 (19)

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