

**Portrait**

Ólafía Rafnsdóttir: Women needed in the wage rate decision process

**Theme**

Robots can save jobs

**Editorial**

The technology leap - a taste of the future

**News**

Agreement on main contractor liability stopped strike

Apr 11, 2014

# Newsletter from the Nordic Labour Journal 3/2014

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Theme: Technology changes working life



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# The technology leap - a taste of the future

Artificial intelligence. The words stimulate the imagination and creativity. What can a robot do? What can 3D technology do for us? How many care sector jobs will be replaced with welfare technology? And imagine what information this editorial might contain if it was written by a robot? This month the Nordic Labour Journal offers a taste of a future with new technology.

EDITORIAL

11.04.2014

BY BERIT KVAM

“Robots do physical things, people create added value,” says Christina Andersson in the story “Robots can save jobs”. She is one of Finland’s strong voices in the debate about robots in our future working life. A lot of effort is being put into the development of robotic, but it has just started. Robots still lack human skills.

Traditional industry has developed advanced production methods and products have been refined. There is no longer space for workers without the right skills. What's now needed is operators of new technology. But highly advanced production systems rely on people using all of their senses creatively; smell, taste, vision, hearing, touch - they're all necessary skills to control and adjust the process.

Sverker Johanssen has written between eight and nine percent of all Wikipedia’s entries, using his computer robot Lsjbot. She selects facts and assembles the information, but her entries are not often read. They lack juice. They’re too dry. A photographer wanted to create the perfect portrait using a robot and 600 photos, but the subject’s soul disappeared. The picture might be a perfect rendition, but at the same time an impossibility.

“Robot journalism pushes the boundaries for what’s possible,” but it has major limitations.

Denmark is investing heavily in welfare technology. The government wants the public sector to sign up to using welfare technology in places like nursing homes to save labour. So far the results have not been convincing, but still: “I have become more independent” says Svend Erik Christensen.

And 3D, how can we use that technology? We’re on the brink of a breakthrough, our report promises.

There seems to be a leap in technological progress in many areas. But no-one knows what opportunities might arise in working life from the combination of artificial intelligence

and electromechanics. For now, we humans are miles ahead with all of our senses. Not least because of our ability to be excited over what is happening.

Are robots man's best friend? The NAO robot sitting next to KTH researcher Petter Ögren is struggling to communicate with his own species. Photo: Martin Malmsten

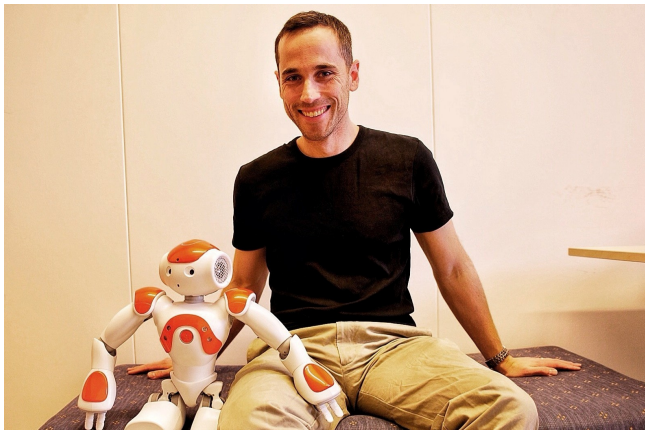
# Robots can save jobs

Robots and increased automation can save many jobs from disappearing. At the same time many low paid jobs disappear when machines take over certain tasks. The NLJ looks at what the new technological revolution means.

THEME

11.04.2014

TEXT AND PHOTO: CARL-GUSTAV LINDÉN



*Are robots man's best friend? The NAO robot sitting next to KTH researcher Petter Ögren is struggling to communicate with his own species. Photo: Martin Malmsten*

In the coming years the combination of artificial intelligence and electro mechanics will change working life at least as radically as the industrial revolution did. Researchers are busy figuring out how robots should look and best be able to work side by side with humans. They can for instance be combined with new services based on self-service, voice and gesture control, always connected machines and gadgets or used in the manufacturing of products by 3D printers.



Automation and robots will probably also open up working life, allowing humans to work with more creative and interesting challenges. Getting rid of dangerous and monotonous tasks will also make jobs more secure and less physically demanding.

The division of labour is clear:

"Robots perform physical jobs, people create value," says Cristina Andersson, 'head coach' for Robotics Finland, which each autumn hosts the European Robotics Week. She is one

of Finland's most vocal people in the debate on robots and the working life of the future.

This also creates new business opportunities and re-industrialisation. Using robots might be the only profitable way of keeping industries running in the Nordic region.

"More and more people say robot technology is the only way to survive in the western world, because the alternative is to move to low-cost countries," says Ingemar Reyier, project director at Robotdalen (Robot Valley) in Västerås, Sweden. The project aims to make possible commercial progress within robotics and automation.



"The trade unions support this fully, because the alternative would be to lower wages in order to keep all the jobs open."

We meet at the Manufacturing and Automation Expo (M.A.X.) at the Stockholmsmässan exhibition centre in Älvsjö, the largest automation trade show in the Nordic region. Here you can watch robots that cut, weld and move stuff around. The car industry started using production robotics on a large scale already in the 1970s. The IRB 6 model from ASEA (now ABB) was the world's first micro computer-controlled and fully electric robot when it was launched in 1974. The robot was painted orange as a warning to people nearby and was put in an iron cage. The trade fair showcases the latest model - ABB's seventh generation robot, now painted graphite white to show that robots no longer should be considered dangerous, but trendy.

### **A long way to go**

Stefan Drakensjö, sales manager at ABB Robotics, says Swedish manufacturing industry still has "a long way to go" when it comes to automation. There is a lot of potential within the health sector for allowing robots to handle heavy work, like moving beds.

"This frees up time for staff to do other things."

Trendy, that's what robots are. They are getting smaller all the time, cheaper and also easier to install and program, which means production cycles can be shortened and become more profitable. Danish Universal Robots' latest product - light and flexible robotic arms - weighs only 10 kilos. American Baxter is another example of new, people friendly and mobile robots which allow you to program them without having to be an IT specialist: grab hold of Baxter's arm and show it what needs doing, and it immediately learns how to move a part of a machine or a parcel. ABB too have simplified programming by introducing the Robot Studio software which resembles a gaming studio with icons instead of computer code.

Ingemar Reyier believes the increased use of robots does not have to mean a lot of retraining. All that is needed is for people who will be working with robots to be "young at heart". There is, however, a great need for many more engineers to create robotic systems. It is also not certain that the way people work right now is the most efficient.

"We shouldn't automatise the bad things."

### **New jobs at car plant thanks to robots**

One concrete example of the importance of automation is the Valmet Automotives car plant in Finnish Uusikaupunki. 200 new ABB robots work there side-by-side with human car workers, building a special Finnish version of Mercedes-Benz' popular model A together. The plant is 90 percent automated, and robots do all the welding for instance. The plant had been mothballed until last autumn after car manufacturer Fisker stopped production, but will soon employ 1,000 people. Some 300 people are being recruited ahead of the transition this spring. The Finnish Public Employment Service has been offering jobs to Swedish car workers from Trollhättan, home of Saab.

Automation has not created new jobs per se, but saved the factory from going under.

"They would never have got the Daimler order without the robots. We have to get the message through that robotisation means more work, increased sales and overall more economic activity," says Cristina Andersson at Robotics Finland. She has co-authored the book 'Boho Business' which explores how men and machines will work together in the future. People must become more creative and flexible, "bohemian", because machines will - technically speaking - be more intelligent, she and Jari Kaivo-Oja write.

Cristina Andersson says robotisation can be compared to a tsunami rolling across the world. She points out that several countries have established national robot strategies, and in South Korea the debate already began eight years ago. USA, France, Germany and the Netherlands already have strategies in place, but not her home country Finland.

### **Robotdalen**

From Finland back to the Manufacturing and Automation Expo at Stockholmsmässan. Thanks to ABB, Sweden is the top Nordic country when it comes to robotics. Ingemar Reyier is a kinetics expert at ABB and has spent the past ten years on loan to Robotdalen where the state matches each krona invested by business. The idea is to create and maintain an entire ecosystem for robotics which will benefit small and medium-sized companies within industry, service and the health sector. Robotdalen helps them through decision-making processes aimed at increased automation. They consider profitability, simulate production processes and develop frameworks for how robotics should be integrated into business ideas.

In recent years Robotdalen has helped make more than two dozen business ideas reality.

Technological progress means it is possible to break down more working tasks into their individual parts, which can then be automated. Robots don't complain. They work 24/7 but when it comes to sensitivity and flexibility they still have a long way to go before they reach human levels. Robots are bound to free people from mundane routine tasks, allowing them to work more creatively, but the question is how many jobs will disappear in the process. There is a risk that people with low education will miss out when routine jobs are automated. Many tasks within retail can be automated, for instance, both logistics and sales. Kivi Systems, owned by online retailer Amazon, already runs fully automated warehouses where orders are sent to robots, which then pick the items and take them to the sales desk where there is no need for salespeople. Amazon is even looking into the possibility of sending the goods home to the customer using drones.

At the same time the term routine work is being widened as machines can now handle enormous amounts of data in no time whatsoever. This means there is soon no need for highly educated people whose job it is to gather and analyse numbers or text, like bookkeepers, accountants or solicitors.

Journalists too need to start thinking about how they provide added value: machines already compile sports and finance news and will take over more and more of routine reporting.

There will still be jobs that cannot be automated, for instance in emotional occupations like therapy, relaxation and spare time activities, culture or sport and exercise.

### **Not yet at our door**

Machines are getting smarter, but not all researchers believe the revolution has already come knocking. We visit Stockholm's Royal Institute of Technology KTH, a leader in Nordic robotics research. There have been several major breakthroughs on artificial intelligence in recent decades, says KTH researcher Petter Ögren.

"But there has been no wave of other solutions, and I would dare to suggest that it's a bit symptomatic for artificial intelligence that the general human intelligence you might be looking for is still a long way away. What you can do is solve certain problems remarkably well," says Petter Ögren.

In the 1990s the Deep Blue computer demonstrated how a computer could beat the world chess champion. A few years ago we got cars that can drive themselves, and since 2007 they can also navigate through city traffic. In 2011 IBM's super computer Watson managed to answer correctly all the questions on Jeopardy, despite the fact some of the questioning was unclear. Watson had memorised 200 million Wikipedia pages.

### **Difficult interaction**

Yet there is a long step from this to robots that can both make use of data and perform physical work. Petter Ögren shows an experiment in which two French NAO robots try to communicate with each other. One points to an object which the other should be picking up, but it doesn't work out well.

"Our PhD students aren't particularly happy with NAO," he says.

The NAO robots have been equipped with Microsoft's game controls for Xbox, Kinect, which came to market in 2010 and quickly became an important part of the lab's equipment, as this gave researchers access to cheap and solid 3D software with camera and distance sensors they could use to control robots via motion and voice controls.

"Interaction with objects is still tricky, and to grip and manipulate things is difficult. The robot butler who can clean and cook is still a pretty distant prospect, even though there are smaller niche products like robot lawnmowers and vacuum cleaners."

KTH hopes to soon be able to demonstrate two robots that can make pancakes together.

The French humanoid NAO is one example of how the cost of making robots can come down. Recently the price of a NAO was halved - down to some 5,600 euro.

### **What about taxes?**

The Nordic welfare societies need robots to keep up with competition and to deal with demographic challenges within the health sector. Ageing populations are putting strains on personnel resources. People working with care for the elderly

could use machines to perform routine and physically challenging tasks. But from the perspective of the welfare state, robotisation is not a purely positive trend. If robots replace people with higher unemployment as a result, tax revenues will fall and social expenses will rise. The notion that innovation leads to higher living standards is not a given, and there will be a need for social reforms.



“But if we don’t do this, what happens then?” asks Stefan Drakensjö at Stockholmsmässan.

He believes this is the only way for the industry to continue to be competitive.



# Denmark supercharges welfare technology

The Danish government wants the public sector to be obliged to use welfare technology in nursing homes and hospitals to a much larger degree. There has been some progress, but the breakthrough has not yet come.

THEME

11.04.2014

TEXT: MARIE PREISLER

Welfare technology is the new black in Denmark, and the government and an increasing number of municipalities say the technology will be important when solving one of the largest social challenges facing the Nordic countries: there are not enough people to safeguard the future welfare state.

Many municipalities and hospitals have in recent years been running a range of welfare technology pilot projects. So far the potential seems to be great, although the gains are not as easy to exploit as previously thought.

Some municipalities have applied robot vacuum cleaners to clean older people's homes, and many nursing centres and hospitals have installed special toilets with built-in washing and drying functions, allowing residents and patients to go to the toilet unaided. Hospital doctors and nurses also save time because of automatic cancer tissue recognition technology, automatic packing of surgical tools and easier access to data. Good experiences have also been had with the use of electronic plasters, sensory sheets which prevent bedsores and technology which allows heart patients to monitor their own treatment online.

But trials have also shown that it is not so easy to exploit the full potential of such technology. Some municipalities have introduced robot vacuum cleaners only to drop them because residents felt they did not clean properly. And the very first trial with washing toilets showed very little of nursing staff's time was actually saved by allowing residents to go to the toilet unaided, because some of them were not able to operate the new technology on their own. Yet in other areas the benefits are enormous.

## **Expand the solutions**

Better robot technology is being developed all the time in order to ease the workloads for employees in the health sector and improve their working environments. It also increases the quality of life and security for individual residents and saves public resources - especially in the geriatric and handicap sectors.

The government wants to speed up this development and has launched a major strategy aimed at broadening the impact of efficient welfare technology solutions to benefit the entire public sector. The government's stated aim is to get the public sector to sign up to using welfare technology to a much greater degree, for instance in nursing homes and hospitals. It has established a fund - the Fund for Welfare Technology - in order to gather well-documented experiences of how welfare technology can renew and improve efficiency in the public sector.

In coming years, Denmark and the other Nordic countries are facing a range of challenges which could have a detrimental effect on public welfare or make it much more expensive: the older population is growing while there are fewer people to pay for them. Meanwhile more and more people are suffering from chronic and resource-demanding diseases. There is also less money in the public coffers because of the economic crisis.

So the public sector must and shall become more effective and to a much greater degree be tailored to the needs of the individual resident, the government says. It points to new welfare technologies as solutions which don't need more workers, nor do they mean existing workers must work harder.

## **Workers agree**

From the workers' point of view, welfare technology helps free up resources, leaving more time to aid and assist residents - for instance by using technology which replaces the need for heavy lifting during bath or toilet use. The government and municipalities also expect technology to help make jobs in the welfare sector more attractive, making it easier to attract young workers - a major future challenge.

Yet in the short run welfare technology is being met with a certain degree of opposition from workers. Trade unions recognise that welfare technology can help improve working environments and frees up time for more contact and care for



residents. But technology should only be used in areas where workers feel it can help them professionally, underlines FOA, Denmark's third largest trade union. It represents public employees in the social and health care sectors. For FOA it is crucial that employees are included in the decision-making process before new technology is being introduced and implemented in their line of work.

New technology changes work processes and responsibility structures and must be adapted to benefit different sectors. This is why it can be a major challenge to get residents and workers to support them. It is necessary to systematically include workers for the duration of the process. They need competence and training and a feeling of ownership of the project, and in reality there is little of this, thinks Susanne Rasmussen, a consultant at the Danish Technological Institute and speaker during a major conference on welfare technology hosted by Denmark's municipalities in May 2014.

The Technological Institute thinks new welfare technology can be everything from "a cost-increasing infernal machine" to "an independence-inducing miracle with massive savings potential". It is necessary to begin with the individual resident's needs. Municipalities must not think that introducing robot technology means they are given a license to print money, says the National Board of Social Services, which has led many of the welfare technology pilots.



Svend Erik Christensen

## "I've become more independent"

Aarhus Municipality is paving the way in introducing welfare technology. For 67 year old Svend Erik Christensen this means he can manage much more on his own — including going to the toilet.

THEME

11.04.2014

TEXT: MARIE PREISLER, PHOTO: PERNILLE BONNE RASMUSSEN

67 year old Svend Erik Christensen has access to a range of different welfare technology in his home at the Sabro community centre near Aarhus. Without them he would be far less independent, he reckons:

"I had two brain haemorrhages three years ago and became paralysed down my left side. For nine months all I could do was lie flat, staring at the ceiling, but since moving here my recovery has really accelerated," he says.

Svend Erik Christensen used to be dependent on nursing staff to get to the toilet, but at the Sabro community centre, where he has been living for two years now, he can manage toilet visits himself, because his bathroom has a special toilet with a built-in wash and dry function.

"My paralysis means I cannot dry myself, but the toilet does it for me. It washes my backside and air-drys it afterwards, and

I can control the water temperature and it all works via remote control. It is incredibly nice to not need help for something so personal and intimate," he says.

Svend Erik Christensen is keen to recover and makes great progress. But so far he needs his wheelchair to get around his own flat, which has been fitted with remote controlled doors, windows and curtains. He is happy that the government and municipalities want to focus more on welfare technology in the future.

"I would never have got as far in my recovery without the technological aids at my disposal, and I feel more independent - it is almost like living in my own house again. So more welfare technology is a good development. Anyone who needs it should have access to the kind of aids I have," he says.

### Room for experiment

Aarhus is Denmark's second largest municipality and is paving the way in introducing welfare technology. More than 500 residential care homes in Aarhus municipality have been fitted with various welfare technology solutions. Robot vacuum cleaners are used more or less in most units, and toilets with wash and dry function are also installed in many homes. Both staff and residents are mostly happy, states Aarhus municipality in a new guide to how to choose welfare technology.

Britt Madsen, a social and health assistant with responsibility for welfare technology at the Rosenvang community centre, agrees. The centre has 42 residential care homes and was renovated two years ago and filled with various kinds of welfare technology: washing toilets, robot vacuum cleaners, lifts, automatic windows and doors, light control in bathrooms and adjustable tables in kitchens and bathrooms.

"The washing toilets and stair chair lifts represent great progress, because they save us staff from doing all the heavy lifting. The toilets are height adjustable so the residents can get up themselves when they have finished. We also save time, and it is satisfying on a professional level to be able to help residents to manage things themselves," says Britt Madsen.

### Staff test products themselves

Most of the centre's residents are too ill to go to the toilet themselves, however, and the staff have not calculated how much time the toilets save. But from experience, the washing toilets helps prevent constipation and urinary tract infections — ailments which make residents very ill and cost staff a lot of time.

Creating new working patterns and introducing new technology does meet with some resistance among staff, says Britt Madsen. That's why it is important to have a key person who can thoroughly explain the technology:



"It is natural for staff to be a bit sceptical to new things, and we had heard about other municipalities where new washing toilets and robot vacuum cleaners were never used or were criticised for not working properly. So all of our staff are trained in how to operate this technology and have tried the washing toilets and the lifts themselves."

She points out the importance of managerial support too, because of the economic implications of staff training and of having key people like herself. If management engages in this technology, it will motivate staff.



Operator John Aspaas controls the fertiliser production. In the background: shift coordinator Jan Bøyesen and outdoors operator Øyvind Bjerva

## The modern industry worker: a new technology operator

“There’s no smoke, nobody seems to be around, what is it you’re doing?” A question often put by foreign visitors to the Director of Herøya Industrial Park. Change, improved efficiency and new technology has made an old industry competitive in the global market, and turned workers into knowledgeable operators.

THEME

11.04.2014

TEXT AND PHOTO: BERIT KVAM

“Higher skills levels are expected compared to only a few years ago,” says John Aspaas. He is an operator at the Yara fertiliser plant in Porsgrunn.

Surveying a number of monitors from behind a large control desk, he controls every step of the production process. A team of four people is all that is needed to keep the entire



production of fertiliser going at this factory: three outside and one at the control desk.

“Yara International ASA is the world’s largest provider of mineral fertilisers and helps provide food and renewable energy to a growing world population,” the company website reads.

Yara began as Hydro in Norwegian Notodden in 1905. Today the global company employs more than 9,000 people and operates in more than 50 countries. The city of Porsgrunn now hosts Yara’s and Europe’s largest production of so-called full fertiliser (NPK) based on the nitrophosphate process. From here, just under 400 employees produce three million tonnes of fertiliser a year. Compare that to the 1970s, when 3,000 employees produced 1.5 million tonnes.

Not many years ago government and political party advisors said Norway’s traditional land-based industry was doomed, says Thor Oscar Bolstad, Director of Herøya Industrial Park:

“It was considered to be old-fashioned and even labour intensive. I said it then and I say it now; these must have been people who had never visited a modern industry workplace. You see nearly no people out in the factory today, and the improvement in efficiency and technology is crazy. So much has happened so fast, and so big.

“One of the major changes has taken place on the operator side of things. Many of the unskilled jobs are gone: sewing bags, filling bags, transport and logistics are all jobs largely taken over by machines and equipment. Today’s operators are more skilled.”

### **In the control room**

“When I started working at Hydro’s saltpetre plant in 1987 I didn’t have a certificate of apprenticeship or anything,” says John Aspaas.

“This never happens now, people coming in off the streets. Now we have apprentices who work here for several years and learn. I have got my certificate of apprenticeship here at the company, but it doesn’t meet today’s demands.”

“Here you see a close-up of the result,” says Jan Bøyesen, pointing to an image of small, round specs:



“On this screen he can see what he is making. Here the product comes out. This is before it is sifted and crushed, because we want a product of a certain size.”

*Did John Aspaas make that?*

“Yes, he and three others who are on duty work together to make fertiliser, which is the product you see here. If he doesn’t do his job, nothing is made, and if the three people out in the factory don’t do their job there is also nothing. So it’s a joint effort between those on the outside and on the inside. The ones on the factory floor wear headsets, look, listen, smell and turn valves and give feedback to the control room if something needs adjusting.”

*How do you keep in touch with the three out working in the factory?*

“I’ve got them on my headset here,” says John Aspaas.

“If something happens, they’ll call me up. I then might have to stop or change things here from the control desk, depending on what the matter is. We have more images than what we see right now, we can rotate the images on the monitors. The entire process, everything that happens, is shown on the monitors and whoever is at the control desk must know every little detail.”

### **Operators - a new occupation**

“We used to have many hands at work. The movement of goods or raw materials was based on lifting or moving something or shifting a few tonnes. Today this does not happen. Those jobs are gone. They are automated, machines and robots have taken over.

“Now we hire young people with solid certificates of apprenticeships to boot, who often take further training. They manage large parts of the factory and sit in control rooms, work out in the factories, look at the running of things, look at maintenance needs and they market these jobs as exciting and future-oriented jobs,” says Director Thor Oscar Bolstad at Herøya Industrial Park.



“When we receive foreign visitors they wonder whether we have closed the factories down because we are expecting visitors. Don’t you have employees? What is happening? What are you doing?”

*Is this not usual elsewhere?*

“No. At Herøya an Austrian company producing magnesium oxide has built a new factory. Some of my colleagues visited similar factories around the world. They returned, saying: we can’t run a factory like that here in Norway. We’re not allowed to make that much noise, we’re not allowed to emit that much dust and we’re not allowed to emit that much gas.

“If you’re building a factory in Norway it can’t be labour intensive. We have to invest in new technology because labour is expensive. Norwegian workers don’t carry out manual tasks anymore. We’re done with this.

“Yara has cut staffing so much that there is no more give. When they want to increase production, they have to do the same with staffing levels.”

### **The control**

“There are three of us outside and one inside who must have an overview over the entire area, carry out inspections and make sure there are no unusual sounds. I have one area outside but I’m not out there all the time. I use the monitors as well to see how things are working out,” explains Øyvind Bjerva and shows how he has his own monitors to control his outdoor area of responsibility.

“These two monitors make up the operator station. Outdoors operators can go in and out. If you discover something suspicious out there, you can go inside to check out what it was you saw.

“Here’s a red light. There’s an alarm. It means the level in the tank is too low.”

*What do you do then?*

“I have to tell the guy who controls the factory,” says Bjerva.

“When the level in that tank is low, I need to increase the amount which goes into it. I need to go in and adjust the vent,” adds John Aspaas.

*Do you have to do many adjustments like that over an hour?*

“Now that we have increased production we need to sit here and pay pretty close attention all of the time.”

The production runs like this 24 hours a day, all year long. The four people on each shift work very independently and make decisions late in the evenings, overnight and at week-ends.

### **Improving efficiency**

*Can operators suggest improvements to the production process too?*

“Yes. if we notice recurrent problems out in the factory, we need to find a solution. We can then suggest ways of solving it which we put in a designated database. The suggestion is then picked up by management and union representatives and looked at.”

It could be a suggestion which simply says ‘we want this thing to change.’ But often the operators have analysed the suggestion very well themselves.

“If management and union representatives agree, changes are made and we get a bonus. Usually a gift voucher. We have been to Reykjavik and to Madrid thanks to things we have come up with,” says Øyvind Bjerva.

“We have what we call a quality award,” adds shift coordinator Jan Bøyesen.

“This factory has won the quality award many times. We are proud of this and it benefits the company.”

“This is the Nordic model in real life,” says the Director of Herøya Industrial Park Thor Oscar Bolstad.

“For us it goes without saying that the operator, director and unions talk together and find solutions together. Coming up with good ideas is also a part of being a modern operator.”



Daniel Boschung (left) lets a robot take 600 pictures to make one single portrait. It can take half an hour, so the subject is placed in an old barber's chair

## Robot journalism pushes the boundaries for what's possible

Robots are taking over tasks only humans used to master, like writing articles and taking pictures. They relentlessly gather information or photograph the same subject hundreds of times.

THEME

11.04.2014

TEXT: BJÖRN LINDAHL, PHOTO: DANIEL BOSCHUNG

Recently an article about an earthquake was published extremely quickly after the event in the online version of Los Angeles Times, thanks to the writer's use of a robot to process information about the event.

This does not impress Sverker Johansson. He has written eight to nine percent of all Wikipedia entries - and we're not talking about the Swedish language edition, but *all* Wikipedia entries.

"I reckon I have written more entries than anyone else in the world," he says.





Sverker Johansson introduces himself in his own Wikipedia entry (above). But most people would have encountered his computer robot, or bot as they are known. Lsjbot, as he calls it, can select text and pictures from different catalogues and turn them into an entry.

A randomly chosen entry can look like this:

*Thacanophrys goldsbroughi is a crustacean first described by Rathbun in 1906. Thacanophrys goldsbroughi is part of the Thacanophrys genus, and the Majidae family of crabs. There are no listed sub species.*

There are source references and a fact box for how the crustacean fits in taxonomically. If you go to “behind” Wikipedia by clicking Show history, you will see that the article has been read three times in the past 30 days, and that three other bots have been making minor changes to the entry.

“Many of the entries are rarely read, but when I look at the statistics they are still read from time to time. Entries on birds are read more than those on bugs. But the day an insect becomes interesting, we’re ready,” he says.

### Over six years with Wikipedia

Sverker Johansson is a trained physicist and linguist. He is the Director of Education and Research at the Dalarna University. For more than six years now, Wikipedia has been his main extra-curricular interest. He is one of several hundred Swedish Wikipedia administrators and is tasked with closing down those who are just messing about or who try to promote a certain point of view.

“I got the idea when I saw someone had done a similar thing on the Dutch Wikipedia. I thought I could do the same thing - only better.”

“I knew how to write code, but not how to program bots. I was forced to learn this. Also I know enough about biology to understand how species databases are constructed.”

### Cebuano and Waray-waray

He has published the more in-depth articles simultaneously in Swedish and the more unusual languages Cebuano and Waray-waray.

“My wife is from the Philippines and Cebuano is her native language. Waray-waray is spoken in some of the eastern provinces.”

He has also written entries on 1,000 Philippine municipalities, of course with the help of Lsjbot.

“My entries on the municipalities were useful during a recent natural disaster. A small village was washed away, and there was an entry about it.”

It took ten years for the Swedish language Wikipedia to go from zero to 500,000 entries. Then Sverker Johansson published one million entries in one go. This prompted some debate and there is still controversy surrounding bot-written entries.

“Many feel professional joy and pride in doing everything by hand. My texts are thin and not great literature. There is a certain margin of error and mistakes can be made during programming. But when it comes to errors, the bot texts do well compared to other written entries.”

### 90 percent computer generated?

The US company Narrative Science has specialised in computer generated articles on companies and sport. A finance publication like Forbes only has enough staff to write quarterly reports on 50 of the 500 largest companies. Narrative Science writes about the remaining 450 - and do it in four seconds rather than 40 minutes per company. According to the company’s CTO Kristian Hammond, 90 percent of news will be computer generated in 15 years time.

“In terms of volume it’s possible to have 90 percent of texts written by bots. But this will not apply to the texts we really read and re-read. It is the remaining 10 percent that count,” says Sverker Johansson.



While both Sverker Johansson and Narrative Science write a little about a lot, the Swiss photographer Daniel Borschung uses an ABB robot to take extremely many pictures of the same subject. He makes portraits made up of 600 photographs of the same face. This makes it possible to study every little detail of the face.

Because the process can take up to half an hour, the resulting image is lacking in facial expression.

“The dialogue between the photographer and the sitter disappears. You’re left with a kind of very honest but at the same time upsetting portraits. Because of the perfect focus people believe it is a true picture, but at the same time the portrait is impossible,” says Daniel Borschung.

How would he describe his relationship with his robot? Is it part of him or an adversary who sometimes puts up resistance?

“For me it is a tool,” he says.

Sverker Johansson calls himself “the happy owner” of Lsjbot in his presentation, as if it were a pet. But he too describes the robot at a tool.

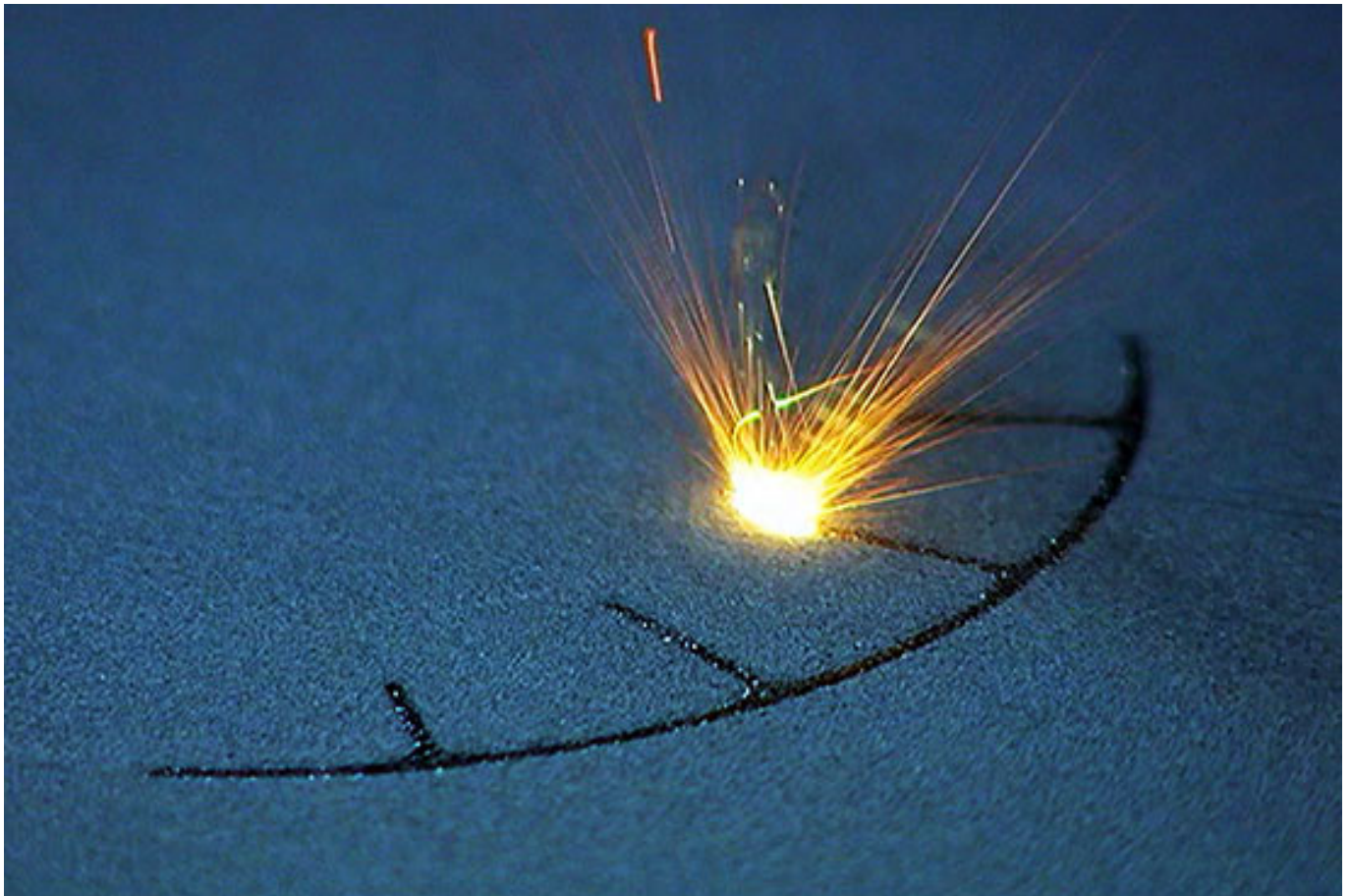
“There is a human being behind the written entry in any case. Different people use different tools to write.”



“I have always looked for ways to create documentary photography using new technology. I then had a very serious mountain biking accident. Before they put screws in my spine which helped me walk again, they CT scanned me for half an hour to know exactly where to put the screws,” says Daniel Borschung.

During that process he got the idea to scan a face in the same way, nearly like mapping it.

“The tricky bit was not to get a robot to take 600 pictures with a depth of field of only one to three millimetres, but to put all of this together into one single image, taking into account the distortion created by moving the camera.”



A laser beam in a 3D printer draws a pattern in metallic powder. The part grows as layer upon layer of powder is added. After the process has been repeated 3,000 times the part is ready

## 3D technology breakthrough pushing up product development tempo

3D printers have been in the spotlight for a long time. They represent technology which now looks like it is having its breakthrough. This is not only about printers becoming cheap enough to buy for private individuals. It is about a completely new production technology which represents the opposite of the way industries produce products today.

THEME

11.04.2014

TEXT: BJÖRN LINDAHL, PHOTO: GE AVIATION

Additive manufacturing is a term used to cover several different techniques with one thing in common. It makes products directly from a digital construction design by constructing an item layer upon layer.

This means only the exact amount of material needed is being used. Today most industries make things the opposite way: You start with a piece of metal and cut, drill and turn it into what you want to make. Or you mould things in casts, which themselves must be made first.



### Design-driven digital direct manufacturing

“One advantage with 3D technology is that you can construct things in a different way. The design and innovation process is different,” says Mats Falck, area manager at Umeå University. He has been commissioned by Sweden’s Innovation Agency Vinnova to head a working group to develop a status report for what is called “design driven digital direct manufacturing”.

It is the first step to make 3D technology a strategic innovation area in Sweden. Once it is done it will be possible to apply for project support to the tune of 100 million Swedish kronor (€11m).

“A couple of Swedish companies are world leaders in additive manufacturing, but that might not be enough to develop a functioning cluster. It might also be an idea to expand the agenda to take in a Nordic dimension,” says Mats Falck.

The two companies are Arcam in Mölndal near Gothenburg and Höganäs Digital Metal in Skåne.

### Which raw materials will be used?

For Sweden this is partly about how metals and cellulose can be used as raw materials in the production process and what the technological development will mean for industry.

So far additive manufacturing has mostly been about various forms of tailored medical and dental prosthetics where each prosthetic is unique, as well as parts for the aviation industry where it is crucial to make items as lightweight and strong as possible.

“Until now it has been more expensive to make products using additive technology than using traditional methods. It has therefore been used more to make prototypes. But while companies often use machines costing a million kronor to make prototypes, a 5-6,000 kronor machine might now be enough for private individuals to create their own work of art, parts for their household machines or their own mobile telephone cover,” says Mats Falck.

### Increased capacity

3D technology bypasses many development steps and will therefore speed up production development. And as the technology matures, the capacity will increase. Höganäs can already make 30 items at a time instead of only one.

3D technology will also have major consequences for where a product is being manufactured. Why transport something halfway around the world when all you need to do is send the construction design over the Internet to a nearby 3D printer? In the USA there is a lot of talk about moving production back home from China.



In January this year GE Aviation announced they were building a new \$100m factory in Indiana, USA, which will manufacture the first jet engines with fuel nozzles made using additive technology. Each engine will have 19 fuel nozzles which the company says will be five times as strong as the previous model. The additive technology means the number of brazing and welding points are reduced from 25 to only five.



GE Aviation will install the new engines in their aircraft from late 2015, which means they must be able to make 25,000 fuel nozzles a year.

Each nozzle will be made by spraying a cobalt and chrome powder onto a surface. The powder is then heated up using a

laser until it melts and gets the precise desired shape. Each layer is thin, so the process needs to be repeated 3,000 times for each part. But by then the fuel nozzle will be able to withstand temperatures of 1,315 degrees Celsius inside the jet engine.

### **Important patents out of date**

One reason 3D technology is taking off now is that some of the important early patents are out of date, which means more companies can make use of the technology.

Another reason is that President Barack Obama in March 2012 announced he'd spend a billion dollars to build a national network of 15 institutes which will act as regional hubs for companies and researchers working on the development of additive technology. The US armed forces is among those very keen to explore the technology.

The consulting firm Wohlers makes prognosis for the future sales of 3D technology. It estimates the industry's global turnover will increase from three billion dollars in 2013 to 10.8 billion dollars in 2021.

If Sweden and the other Nordic countries want to keep up, there needs to be an education drive too.

"So far we've had only four Swedish PhDs on additive manufacturing," Vinnova administrator Jens von Axelsson points out.

### **Criticism of Vinnova**

According to Evald Ottoson, one of the most central people within Swedish 3D technology, Managing Director at Protech and spokesperson for the newly established trade organisation SVEAT, Sweden was a world leader in additive manufacturing in the 1990s.

"Thanks to the work mainly done by the IVF research institute, Swedish industry was able to keep up with the international development and make industrial use of the new additive technology," he writes in an opinion piece for Ny Teknik magazine.

"This positive development for Swedish industry came to an abrupt end when Vinnova, while preparing a research proposition in the early 2000s, concluded 3D printers and additive technology would not be of any importance to Swedish industry. The result of this catastrophic conclusion was that pretty much all the people with skills within additive manufacturing left Sweden or changed trade. The skill disappeared to the USA, Norway and the UK, who happily welcomed it."



Each roll of plastic film contains one million memories. Mikko Paakkolanvaara, Anton Popiolek and Jakob Nilsson are among those who have joined Thinfilm to be in from the beginning as the technology develops. The printing press in the background

## New production methods could revolutionise entire industries

Norwegian Thinfilm has just developed a revolutionary technology, printing electronics straight onto a plastic film at their plant in Swedish Linköping. It makes it possible to develop intelligent labels which can tell whether a product is being stored at the right temperature, and much more.

THEME

11.04.2014

TEXT AND PHOTO: BJÖRN LINDAHL, THINFILM

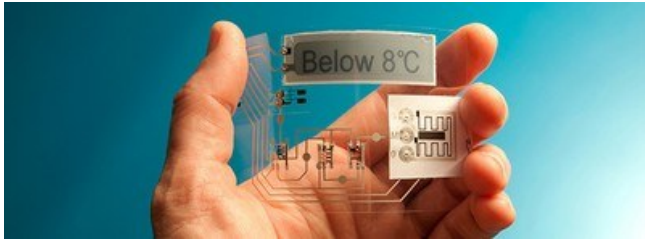
Thinfilm has become a symbol of the development towards what has become known as The Internet of Things. Publica-

tions like The Economist and Forbes have been queuing up to write about their technology of printing electronics.



Adding computing power to products has been going on for a long time. Smartphones are veritable all-in-ones containing digital compasses, tape recorders, maps, games and cameras in addition to the basic function - being able to call people.

But the processors which make all these things possible are relatively expensive. Putting one of them on a milk carton just to be able to decide if it has been kept at the right temperature just doesn't pay.



"There is already a market for labels that change colour if the temperature rises above a certain level. They only cost a couple of cents apiece. There are also sophisticated monitors which give you the entire history, but they cost ten dollars. We want to develop products which we can sell from 20 cent to a dollar," says Christer Karlsson, Thinfilm's Chief Technology Officer.

The information which can be stored in Thinfilm's intelligent labels is so far not much - 20 bytes. But this is enough for a million different combinations if you for instance want to use the memory for a code which shows a product to be an original and not a pirated copy.

Thinfilm's technology builds on classical printing technology. Instead of black, they use a kind of silver nitrate which is a conductor. By putting six different layers on top of each other on a plastic film, one single memory can be built and later combined with a sensor and a small display which is what Thinfilm then calls a system tag.



"The difference from making processors using silicone technology is that you need ten billion dollars to build a new factory. Electronics companies have robots which can assemble 10,000 components in an hour. Our investment is one tenth of a thousand of that cost," says Christer Karlsson, who has been with Thinfilm from the beginning.

### **200 million memories in one year**

It has taken time - the company was founded in 1987, but now a shining new Kroenert printing press has been specially constructed to fit into Thinfilm's Linköping space.

"Its capacity is 200 memories. Some might call this a very advanced pilot line, others might call it a fully functioning production plant," says Jakob Nilsson, who is responsible for memory products at Thinfilm.

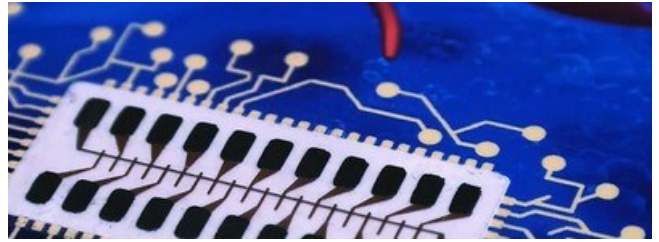




So far only one operator has been hired, Sacke Järvenpää, but the company is advertising for one more. Sacke Järvenpää takes out a container with liquid silver nitrate, which is surprisingly small considering the liquid must cover a 1,500 metre long roll of plastic film. But the liquid will be printed in a layer only 0,0000001 millimetres thick. Inside the machine the liquid will dry and then the process is repeated five times with four different liquids.

“Out of these it is the ink containing the ferroelectric polymer which is the most interesting. It is being used in the active layer, and it is the ink we have spent the most time developing,” says Jakob Nilsson.

When one roll of plastic memories is finished - there is one million on each roll - each memory needs to be programmed with whatever information it should hold, and this is done in a special machine. The memories must also be mounted together with the other components. Using so-called NFC technology the system labels can communicate too. Using radio waves, enough energy can be sent for the labels to answer from shorter distances. The communication can happen for instance using a mobile telephone, which can then pass that information on to anywhere in the world.



### Unique head start

For now, Thinfilm is enjoying a unique head start in printed electronics. The market is limited to how many objects there are in the world where adding a certain amount of intelligence would improve the product. If these objects were to increase in value by only one percent, this would represent 100 billion dollars.

“Two of the innovations which have had the greatest impact on humanity are the printed press and the transistor. We combine the two by printing logic onto our system products,” says Jakob Nilsson.

How this will impact on working life is almost impossible to predict. But a world where billions of objects can communicate with one another is both promising and frightening.



## Ólafía Rafnsdóttir: Women needed in the wage rate decision process

Iceland is known internationally for its strong female leaders, but men have been the ones deciding wage rates. Ólafía B. Rafnsdóttir became the first female President in 122 years of Iceland's trade union for commercial workers, VR, when she was elected last year.

PORTRAIT

11.04.2014

TEXT: GUÐRÚN HELGA SIGURÐARDÓTTIR

“Women must be willing to take more responsibility for influencing how the ASÍ leadership develops, as well as that of the individual trade unions,” she says.

ASÍ is the Icelandic Confederation of Labour, and unlike the Confederation of State and Municipal Employees, ASÍ has never had a female in a leadership position. Ólafía B. Rafnsdóttir is the first female leader in one of the member unions. She joined VR as a switchboard operator in 1989 and has worked her way up the career ladder ever since.

VR faced a deep leadership crisis after Iceland's financial crash. The union's former leader suffered a major loss in the 2009 election following harsh criticism. This led to major reform within the union and the union management, and Ólafía was voted into the management team in the spring of 2013.

“It is a challenge for me to be the first female leader of VR's 122 year long history,” the VR President Ólafía B. Rafnsdóttir said proudly.

“It has been hard work taking the reigns and to achieve solidarity within the union. Solidarity is needed if we are to reach our aims for a new collective agreement,” says Ólafía.

### **Nordic solidarity model**

The current collective agreement is unusual as it only lasts for one year, ending on 21 December 2014. Trade unions must start preparing for new negotiations right now. The idea is to base the next agreement on the Nordic solidarity model. Ólafía explains how the trade unions plan joint wage negotiations but that they won't necessarily follow the solidarity principle.

“Very soon we will see whether the unions will follow the strategy or whether they have other plans for the future,” she says and thinks it is important to carry on with a wage policy based on solidarity for the entire labour market.

Icelandic teachers have been on strike this spring and other trade unions have given notice of strike action. Ólafía says unions demand increased purchasing power according to what is stipulated in VR's new collective agreement. She feels the most important thing is to increase purchasing power and reduce inflation.

“For purchasing power to continue to rise, employee organisations must join forces. Certain groups cannot be left behind developments,” thinks Ólafía, who also sees it as important that consumers keep an eye on price developments and alert trade unions if the trend changes.

“We hope to be able to improve consumer price consciousness,” she says.

She is not worried about rising inflation.

“We must make sure the economy gets going again properly, so that families can experience improved living conditions and decent wages. Young people must be able to afford to start a family and have their own place to live,” she says.

### **Disappointed employee organisations**

It is less than one year since Iceland got a new government. Ólafía says Icelanders have had great hopes for the new generation who took over. Employee organisations have also had great expectations for the new government to introduce new work methods.

“The government has established various task forces which work on questions which concern society as a whole and living conditions in Iceland,” she says.

“But the trade unions are disappointed. We had great hopes for being part of the task forces, but we have not been allowed to take part in their work. We are not happy with this,” says Ólafía.

One example, she says, is housing. The government has offered households a tax break which can either be earmarked mortgage down-payments or saving up for housing.

The employee organisations have expressed concern that low-paid workers don't have the same opportunity to save for housing and that they therefore cannot make use of this tax break. High earners benefit the most from the government's offer, despite the fact that they don't need government help to get rid of old debt.

“Low-paid VR members pay high rent and cannot afford to buy a place to live. It is important to give that group of people more help,” she says.

VR has a separate working group dealing with housing issues. Ólafía thinks the group will soon present proposals for how VR can help solve the housing problem.

The EU is a sensitive issue in Iceland. VR is not expressively in favour of membership, but Ólafía is waiting for a report from ASÍ and the Confederation of Icelandic Employers which will be published soon.

### **We won't stop**

Ólafía B. Rafnsdóttir has been working hard all her life.

She left school at 16 to look after her first child. She had six siblings and her parents worked hard. Her life has been shaped by the fact that as a young woman she had to manage on her own and provide for her family. She had three sons and had to raise her sons in one of Reykjavik's largest districts.

Ólafía B. Rafnsdóttir spent several years working with collective agreements and how to interpret them. Later she got a university degree and specialised in personnel issues before becoming head of personnel for a private media company in Iceland. She has been particularly interested in gender equality issues.

### **Men decide wages**

Iceland's employers' organisations are led by men. Employees in Iceland are mainly led by men. The VR President is the only woman within the ASÍ negotiation delegation, despite the fact that women make up nearly half of Iceland's workforce.

VR has led the fight for equal pay and equal rights to parental leave. VR has made 19 businesses and public companies with more than 3,000 workers agree to use a new certification standard in order to achieve equal pay for equal work. The companies get a certificate when they can prove that they provide equal pay according to the certification standard.

The companies have been happy with the certification standard which they have been able to use as a tool to equalise salaries and deal with wage differences.

“It has worked well both ways. We have one example where even men have seen a wage increase, but in most cases it is women’s salaries which have been regulated upwards,” explain Ólafía.

“We won’t stop until we have achieved full wage equality.”

### **Not tempted by politics**

Ólafía has managed the election campaign for several social democrat leaders in Iceland, and even one presidential campaign. She enjoys important and demanding work. But she has no political ambitions. The election campaigns are always stand-alone projects to her.

“Politics doesn’t appeal to me,” says Ólafía B. Rafnsdóttir.

“I am attracted to the work within VR, however. Hopefully I will be able to work for VR for a few more years,” she says.

“When it comes to the ASÍ leadership post, this is not something that crosses my mind much. I’ve been elected President for VR just for one year at a time, so you never know what will happen,” says Ólafía B. Rafnsdóttir.

She is ambitious and won’t exclude anything.

# Agreement on main contractor liability stopped strike

A bit of history was written in the evening of 31 March when a new collective agreement was reached on main contractor liability within the Swedish construction industry. It prevented strike action with hours to spare and will see the employers' organisation the Swedish Construction Federation (BI) establishing a fund to guarantee wages for subcontractors' workers.

NEWS

04.04.2014

TEXT: KERSTIN AHLBERG, EDITOR EU & ARBETSRÄTT

Experience shows long chains of subcontractors increase the risk of a shadow economy and unfair competition from employers who don't fulfil their obligations to their employees. During the 2013 wage bargaining round, the Swedish trade union for construction workers, Byggnads, demanded that BI's members must take responsibility for subcontractors' payroll liabilities.

Already at this early stage, Byggnads gave notice of strike action to have its demands met. But with the help of mediators the parties agreed to establish a joint committee "for an ordered construction industry" which would investigate the issue further under the leadership of a neutral moderator. This way Byggnads and BI managed to avoid strike action and reached a collective wage agreement which would last for three years.

To make sure something would really happen, the committee was given only one year to come up with the goods. If it failed to present a result acceptable to both parties by 14 March this year, the three year wage agreement could be terminated prematurely. And that is what happened. Byggnads terminated the agreement and announced 1,400 construction workers would go on strike beginning on 1 April. Three mediators were appointed and the day before the strike was due they presented a proposal for a new collective agreement which both sides accepted.

## **Fund pays wages - as a last resort**

The wage provisions remain the same. What is new is that the parties have agreed on a system of main contractor liability. Byggnads had demanded a joint liability model akin to what exists in Norway (and Germany), where employees who are not paid on time can demand that their wages are paid by any company higher up in the chain of contractors. The employ-

ers were fiercely opposed to this. Instead, the solution is that BI and its members will establish a fund which will give construction workers compensation for work carried out "when all other possibilities have been exhausted".

This means Byggnads and the main contractor will work together to try to get the employer to pay up. The fund will only kick in when this does not work. To help the trade unions investigate whether workers are paid the right amount, the general contractor will also have to have an up to date list of its own subcontractors and in turn their subcontractors.

## **Both sides happy**

Both sides seemed very happy at reaching the agreement. Byggnads and BI have long been cooperating in various ways to deal with cowboy contractors.

A BI press release says the organisation cannot accept "misuse or irregularities or the abuse of people through social dumping".

"The conflict has never been about companies not wanting to take responsibility, we already do. The most important thing is that companies can't take financial responsibility for other companies' actions. Today's solution allows us to avoid this," says BI's CEO Ola Månsson.

Byggnads calls the agreement historic.

"Together with the employers we will now continue our joint efforts to create a construction industry we can be proud of," says the union's Negotiating Secretary Torbjörn Hagelin.