Volvo Group magazine 5.2018

THIS PAGE IS ACTUALLY NOT BLANK.

To see it, you need to download the Volvo Group AR Stories app and view it through your device. The same app gives you access to lots of other augmented reality features inside the magazine, which all focus on technology and innovation.

Download on the App Store

GET IT ON Google Play

The future is closer than ever

DEAR COLLEAGUES!

We innovate, not for its own sake but to turn radical technical development into practical benefits for customers and society. The last couple of years have been exciting, marked by important decisions that will take us into the future.

What we are capable of demonstrating today within automation, electromobility and connectivity is unique in our industry and it shows the strength and the scope of the Volvo Group.

The rapid development of new technologies, digital in particular, offers great potential. To achieve fast adoption, a different approach to innovation is required. It will be more important to work with an ecosystem of partners, to test and iterate new products and solutions directly on the market in order to increase the speed of innovation cycles.

WE HAVE DEVELOPED a number of innovative ways of working around the world and the most recent addition – both as a location and a way of working – is CampX. The main purpose of CampX is to create an arena where we will combine internal and external teams with the ambition of co-creating future transport solutions in a spirit of entrepreneurship.

I often get asked 'is this the end of combustion engine technology?' My answer is no. The future of sustainable mobility consists of a mix of different propulsion systems. Each technology has its own advantages, but, only when the right technology is used for the right application, will it become a game changer.

So, we will continue to refine our diesel engines, aerodynamics, cab comfort, head-lights and all the other well-known technologies, in parallel with the development of electromobility, automation and connectivity. Innovation within these technologies is as important as ever and we spend the main part of our research and development investment within well-known technologies.

IN RECENT YEARS, we have been able to present an impressive line-up of electrified and autonomous vehicles and solutions. We are capable of taking steps like these because of the competence and know-how we have built in the Volvo Group. I am proud of what we have achieved and confident about our future ambitions.

Today, the future is closer than ever – you can find it on the following pages in this very magazine. ■

LARS STENQVIST,
CHIEF TECHNOLOGY OFFICER VOLVO GROUP & EXECUTIVE VICE PRESIDENT GROUP TRUCKS TECHNOLOGY

On occasion, members of the Executive Board take turns writing the editorial.

VOLVO GROUP MAGAZINE is aimed at all the co-workers within the Volvo Group. It is published five times a year in Swedish, English, German, French, Portuguese for Brazil, Polish, Russian, Japanese, Dutch, Korean, Thai, Chinese and Spanish. **PRINT RUN** approx. 75,000 copies **ADDRESS** Volvo Group Magazine, Volvo Group Headquarters, Dept AA13400, VLH6, SE-405 08, Göteborg, Sweden **PHONE** +46 (0)31 66 00 00 **E-MAIL** groupmagazine@volvo.com **EDITOR RESPONSIBLE UNDER SWEDISH PRESS LAW** Tobias Wilhelm **EDITOR-IN-CHIEF** Tobias Wilhelm **EDITORS** Åsa Alström, Lotta Bävman, Monika Voland and Linda Joneland. A Group-wide Editorial Network also contributes content. **MARKET LANGUAGE REVIEW** Tobias Wilhelm **EDITORIAL PRODUCTION** Spoon (project team: Linda Swanberg, Jimmy Håkansson, Nic Townsend, Pernilla Stenborg, Ken Niss, Sofia Hammarin) **PRINTED BY** LSC Communications **CHANGE OF ADDRESS** Contact your local HR **TRANSLATED BY** Jeanette Kliger

Volvo Group magazine 5.2018

8

Influencing the influencers

At the latest Innovation Summit in Berlin, the Volvo Group once again forged stronger ties with policy makers, media, customers and society at large.

ALWAYS INSIDE

Your magazine in new dimensions

IF YOU ARE reading this in a printed magazine, you are part of an old narrative tradition dating back several centuries. However, just like the combustion engine, the medium of print is being challenged by technological development. With innovation and technological leadership as the theme in this issue, it therefore feels absolutely right to test new technology as a means of enhancing the reading experience of *Volvo Group Magazine*!

Downloading our new Augmented Reality (AR) app gives you the opportunity to experience totally new dimensions of the autonomous transport solution known as Vera and Volvo CE's Electric Site. Or why not enter the world of the technician and examine a D13 engine at close quarters?

At the end of the day, what determines whether technological development leads to innovation is quite simply whether it creates value for someone. For this reason, we are incredibly curious to see how you experience the AR content of this issue. Please feel free to contact **groupmagazine@volvo.com** and tell us.

We hope you enjoy the magazine and the AR experience!

TOBIAS WILHELM,
EDITOR IN CHIEF

How to get started with AR

1 **DOWNLOAD THE APP VOLVO GROUP AR STORIES**

2 **FIND INTERACTIVE ARTICLES**

3 **VIEW IMAGE THROUGH DEVICE**

4 **EXPERIENCE AR-MAGIC**

Download on the App Store

GET IT ON Google Play

Smart societies – new transport opportunities

THE VOLVO GROUP'S MISSION is to drive prosperity through transport solutions. As the need for transport continues to rise, so could problems such as road accidents, air pollution and congestion, unless we, as a society, find smarter solutions. What will it take to build a silent, emission-free city?

Or a cleaner, safer and more resource-efficient world? To improve mobility and quality of life, the Volvo Group envisions smart societies based on automation, electrification and connectivity. Read more in this issue and watch Volvo Group's future scenario "Smart societies" through the AR app.

VIDEO: See the future in action

DOWNLOAD THE APP
VOLVO GROUP AR STORIES

Download on the App Store

GET IT ON Google Play

Find apps to build on

FOR THIS ISSUE, we made an AR-app! Thinking about making an app to support your work? Make sure to check if someone has already made an app you can build on. The Mobile Center of Excellence has more than 160 mobile apps in its portfolio and supports all brands and entities in the Volvo Group. Check it out!
apps.volvogroup.com

New home for Volvo CE HQ

Volvo CE's new headquarters

VOLVO Construction Equipment has moved into its new headquarters on Campus Lundby in Gothenburg, Sweden, the same site as other Volvo business areas. The move will facilitate sharing resources, best practice and competence, as well as creating even more opportunities for collaboration.

Campus Lundby is a large site, covering an area of 375,000m² – equivalent to 54 football pitches. At the site, Volvo Construction Equipment shares a building with Volvo Buses and Volvo Penta. The building is situated close to the Volvo Group headquarters and other Volvo Group organisations.

Teaching the next generation

THE UD TRUCKS' Foreign Technical Internship Program accepts trainee technicians from other countries. It is designed to help trainees acquire technical skills that they can take back and share in their home countries.

While the trainees gained insight into truck maintenance, their hosts in Japan also had a positive experience. Kanamaru Takahiro says: "In all, the Kanto region will accept around 50 foreign technical interns this year. I expect our technicians to gain a lot by working alongside these trainees, who have a positive attitude and are highly motivated."

Recently, 12 trainee technicians from the Philippines joined four customer centres in the Kanto region of Japan.

The Kanto region of Japan will accept around 50 foreign technical interns as part of a programme run by UD Trucks this year.

A bus that drives itself

VOLVO BUSES IS now not only a pioneer in electromobility, it is also a leader in automation. In June, its first autonomous bus was demonstrated during the Volvo Ocean Race in Gothenburg, Sweden.

The 12-metre bus is equipped with sensors to navigate. It is also energy efficient, has low operating costs and is environmentally friendly.

"I feel immensely proud that Volvo Buses can announce yet another first – the autonomous bus! We are part of creating a sustainable and safe future for coming generations," says Håkan Agnevall, President Volvo Buses.

Volvo Buses new 12-metre autonomous bus prototype is equipped with sensors to navigate.

THE NUMBER

25

Starting in 2019, solar power will contribute towards the goal of making production CO_2 neutral in India. It will also lower energy costs by 25 per cent for Volvo Group's plant locations in Hosakote and Peenya in India.

One episode of Mack Trucks' RoadLife features eight-year-old entrepreneur and environmentalist Ryan Hickman.

Life on the road with Mack Trucks

EIGHT-YEAR-OLD environmentalist Ryan runs a successful recycling business in California, USA. Now his story is profiled in Mack Trucks' RoadLife series. The series follows truck drivers on the job and other real-life road stories. Behind it is a sophisticated marketing ecosystem to support sales.

Much of the work that went into producing the RoadLife campaign was done in-house, explains John Walsh, Vice President of Marketing for Mack Trucks. "Our team was out there on the road. I think that comes through in the genuineness of the series."

Neil Tolbert, Director of Marketing and Communications for Mack Trucks, led the team working on the series. "We pride ourselves on rolling up our sleeves. It's just amazing seeing it all come together."

RoadLife episodes are available on roadlife.tv and Amazon Prime Video.

Josiane Bélanger was awarded the grand prize at the Inspire Awards. Here together with Ralph Acs, President.

Inspiring employees

NOVA BUS AND Prevost hosted their first Inspire Awards, an employee recognition programme based on Volvo Group values.

At the awards event in August, the red carpet was rolled out and the finalists were celebrated. Of the 318 nominations sent in by peers, there were fifteen finalists, five award winners and a grand prize winner.

Best truck driver crowned

THE WORLD'S BEST all-round truck driver was crowned at the world final of the Volvo Trucks Driver Challenge 2018 held in Gothenburg, Sweden. This year's contest involved more challenges than ever before and attracted professional drivers from 33 countries.

The competition draws attention to the important work done by drivers all over the world. "Their skills are often the decisive factor in the productivity and profitability of our customers," says Maria Bergving, SVP Brand, Marketing and Communication at Volvo Trucks.

Piotr Krahel from Poland was crowned the world's best all-round truck driver.

Renault Trucks gets gold

RENAULT TRUCKS has been awarded a gold rating for its commitment to Corporate Social Responsibility by EcoVadis, an independent CSR assessment platform. EcoVadis covers 190 purchasing categories rating 45,000 companies in 150 countries. Renault Trucks is now part of the top five per cent of its highest-rated companies.

During the past two years, the Volvo Group has advanced its position as thought leader in new transport solutions. Volvo Group Innovation Summits have played a decisive role.

TEXT LINDA SWANBERG **PHOTO** MARIUS BAUER

LEADING BY EXAMPLE

Volvo Trucks' autonomous and electric transport vehicle wowed the crowd at the Innovation Summit in Berlin, Germany, in September.

"Shaping the future of transport – how to govern change" was the theme of one of the debates in Berlin. Here, Martin Lundstedt, CEO Volvo Group, discusses with Sören Bartol, Member of the German Bundestag, SPD, and Timm Fuchs, Deutscher Städte- und Gemeindebund. Lars Stenqvist, CTO Volvo Group, talked about the opportunities presented by the new technologies like automation, electromobility and connectivity.

LET THE SHOW BEGIN!

When the live demonstrations of innovative solutions from the Volvo Group start in front of the Tempodrom in central Berlin, it marks a strong conclusion to the afternoon's discussions on how new concepts of mobility can help to create the future of smart societies and the impact they have on society and the environment. The invited guests include politicians, customers and representatives from organisations and international media.

It is no coincidence that the Volvo Group chose to organise its fourth Innovation Summit in Berlin. Germany is the largest economy in Europe, as well as being an important market for the Volvo Group. The rules and regulations set here have a big impact on the industry. Besides that, in many of the country's federal states and cities, discussions are under way to determine how to tackle the challenges of increasing transport and cut carbon emissions by investing in new technologies.

Anna Arbius

"A lot is happening in Germany within these areas right now. The competition is fierce, so it's a bold decision to host the Volvo Group Innovation Summit in Berlin. But we want to make sure that we are a player and our voice is heard," says Anna Arbius, Director Innovation Communication Volvo Group, who is leading the work on Innovation Summits.

"We must ensure that we are seen and heard in the places where the people that affect outcomes are located."

ANNA ARBIUS, DIRECTOR INNOVATION COMMUNICATION

THE SUMMITS ARE designed to encourage dialogue with people who set the agenda for future transport solutions. New technologies need new rules and regulations and the legislation currently being introduced will impact the Volvo Group for many years to come.

"If those of us representing the transport industry are not included as a partner or sounding board when this legislation is discussed, there is a real risk that it will be wrong for both ▶

At the Volvo Group Innovation Summit in Berlin, the list of speakers included many well-known names. Oliver Wittke, Parliamentary State Secretary at the Federal Ministry for Economic Affairs and Energy, and Andreas Scheuer, Federal Minister of Transport and Digital Infrastructure, were two of them. "Having a minister as a speaker is incredibly impactful. If Andreas Scheuer can take the time to talk to us, I'm sure there are plenty of other people who will do the same," says Anna Arbius.

Showing innovative development projects related to the discussion in the fields of automation, electromobility and connectivity is an important part of every Innovation Summit. Berlin saw the world premiere of both Vera and the LX2, Volvo CE's full-electric wheel loader concept. "The demonstrations prove that we know what we are talking about," says Lars Stenqvist.

"I think this new way of communicating has played a big part in getting results."

LARS STENQVIST, CTO VOLVO GROUP AND EVP GROUP TRUCKS TECHNOLOGY

us and society. To reach the right people, we must ensure that we are seen and heard in the places where the people that affect outcomes are located. Our goal is to influence the influencers," adds Anna Arbius.

The first Innovation Summit was held in London in May 2017. Since then, similar events have been organised in Brussels and Beijing.

Lars Stenqvist, CTO Volvo Group and EVP Group Trucks Technology, can see that this way of working has raised the Volvo Group's profile.

"There are many people – customers, customers' customers and representatives of society – who contact us and ask how we can help them tackle the challenges they are facing. As I see it, this shows that we are seen as skilled and interesting to work with."

EVERY VOLVO GROUP Innovation Summit starts with discussions about the future and how new technologies can contribute to progress in important issues like productivity, traffic safety and the environment. By adding live demonstrations of development projects such as Vera and LX2, the Volvo Group reinforces its credibility.

"I think this new way of communicating has played a big part in getting results. Nowadays, we are far more open in the way we talk about future solutions. We are not afraid to be clear about the direction we are heading and what we believe in. It is also something that differentiates us from our competitors. Many only talk, we are walking the talk. It gives us a greater impact," says Lars Stenqvist.

In addition to gaining credibility and huge amounts of media attention, showing off real-life applications of disruptive technologies contributes to the strong image of the Volvo Group as a high-

tech company and an exciting employer.

"There are many talented people that want to work for us. We are seen as an attractive employer and this kind of communication helps us strengthen this position," says Lars Stenqvist.

AT THE VOLVO Group's office in Brussels, staff have also noticed the positive effects of the Innovation Summit that was held there last year.

"It was a very successful event and we received a lot of visibility in Belgian media. Many stakeholders now recognise the Volvo Group as a leader in innovative technologies," says Frédérique Biston, Head of Volvo Group Representation, EU Office.

After the Innovation Summit, the Volvo Group has substantially increased its visibility in various Brussels-based foras and events, thanks to an increasing amount of invitations coming from a wider range of EU stakeholders. It has also had several requests for engineers to come and talk about their innovations.

"The Volvo Group Innovation Summit is a way for us to tell the world what we believe in and our view of the future of transport. In Brussels, it has definitely given us a competitive advantage being regarded as a trusted, innovative and responsible stakeholder in the industry," says Frédérique Biston. ■

VOLVO GROUP INNOVATION SUMMIT

▶ Designed to position the Volvo Group at the forefront of global conversations on the future of mobility and to spark dialogue between industry, academia and policy makers on how to use innovation to increase efficiency, lower environmental impact and improve traffic safety.

▶ In 2017, the Volvo Group organised Innovation Summits in London, Brussels and Beijing.

The Innovation Summit is a cross-functional collaboration between different business areas in the Volvo Group. In Berlin, all the guests were offered a ride on Volvo Buses' electric hybrid bus. "Berlin has only recently ordered its first fully electric buses, so it felt really good to be able to show people just how much progress the Volvo Group has made in this area," says Lars Stenqvist.

What was your main takeaway from the Innovation Summit in Berlin?

SEBASTIAN SCHUMANN, REWE
"I really liked the open way in which the Volvo Group includes all stakeholders in this issue. I don't think that every company would do that. It was also very interesting to see Vera."

GERHARD NOWAK, PARTNER, PWC STRATEGY& GERMANY
"It was exciting to learn how the Volvo Group has produced its invention towards electrification and automation and then, at the end of the day, have the opportunity to see it in a demonstration. The future has already started."

Vera's futuristic design immediately distinguishes it as something very different from anything that has ever been seen before, but, while it might look like something from science-fiction, the intention is to offer it as a solution for real operations.

The show stopper

Mikael Karlsson

Bo Larsson

Vera took centre stage at both the Volvo Group Innovation Summit in Berlin and the IAA in Hanover last September. The autonomous, electric and connected vehicle has since generated plenty of international media coverage and online discussion.

TEXT NIC TOWNSEND **PHOTO** MARIUS BAUER

IF THERE IS one vehicle that best represents the level of innovation and visionary foresight within the Volvo Group at the moment, then surely it is Vera – the culmination of the Volvo Group's development work in the fields of automation, connectivity and electromobility.

"When we started this project, we began by putting ourselves in a future scenario and asking what a cutting-edge transport solution might look like," explains Mikael Karlsson, Vice President Autonomous Solutions, Volvo Trucks, who has overseen the Vera project from an initial idea to an actual functional vehicle. "We then used a rubber band approach, where we stretched our insights back and looked at what we could do already today to reach our vision. Vera is essentially our way of building something that can take us into the future."

SINCE ITS UNVEILING, Vera has generated plenty of publicity in both traditional trade press and mainstream news outlets. As a flat, cab-less, autonomous vehicle that operates in near silence, it is not difficult to see why.

But, for all its vision and ambition, is Vera commercially viable? That is certainly the intention and the team behind its development think it will be operating soon in its intended application: repetitive tasks, over short distances, such as transport between logistics hubs.

"This project is very much business driven," says Bo Larsson, Project Manager for Vera at Volvo Trucks Autonomous Solutions. "We have worked closely with customers and other partners and co-created a future transport system for a specific task."

Vera has received some criticism too, from people concerned about the impact on truck

Take a closer look at Vera in AR

DOWNLOAD THE APP
VOLVO GROUP AR STORIES

Download on the App Store

GET IT ON Google Play

"We began by putting ourselves in a future scenario and asking what a cutting-edge transport solution might look like."

MIKAEL KARLSSON, VICE PRESIDENT AUTONOMOUS SOLUTIONS, VOLVO TRUCKS

drivers' jobs. It is a fear that Mikael Karlsson has become accustomed too, but he believes it is unfounded. "Looking at the bigger picture, we will need more skilled drivers, not fewer. We can see a boom in e-commerce and internet trade that shows no sign of slowing and we need to manage this in a sustainable way while still meeting people's need for next-day deliveries. I think in the future we will see increased automation where it makes sense, such as for repetitive tasks. But this in turn will drive prosperity and increase the need for truck drivers in other applications instead."

Vera is different from anything else ever seen in the transport industry before, so it is understandable if people are sceptical. But, considering it took only three years to develop, it is not at all inconceivable that solutions like Vera will be in common use far sooner than many think. ■

The small machine that signals a big change

With its LX2 full-electric compact wheel loader concept, Volvo Construction Equipment has developed a product that could kick-start the process of decarbonising the construction industry.

TEXT NIC TOWNSEND **PHOTO** MARIUS BAUER

UNVEILED AT THE Volvo Group Innovation Summit in Berlin, the LX2 is a five-tonne compact wheel loader powered entirely by electricity. This means it can operate with zero emissions and low noise, making it ideal for urban construction, light infrastructure and landscape gardening. Compared with a diesel engine, efficiency is dramatically improved. Behind the innovation is a team with a strong entrepreneurial mindset.

Since it can operate with zero emissions and low noise, the LX2 full-electric compact wheel loader is ideal for applications such as urban construction, light infrastructure and landscape gardening.

FACTS LX2

Driveline: Full electric motor with lithium ion batteries

Charging: The batteries can be fully charged overnight from a regular household plug with 3 kilowatts. It can also be fast charged.

Weight: Five tonnes

"We have taken a L25H compact wheel loader, removed the engine and put in a battery stack and electric motor," explains Ulrich Fass, Manager, Emerging Technologies Europe, Volvo CE. "Through a clever design, more or less using off-the-shelf components, we have managed to develop a machine that could trigger a change in the whole construction industry."

Upcoming Euro 5 and Tier 4 emission standards are driving the need for alternative drivelines, but, when it comes to making compact equipment compliant, this will require a significant increase in complexity and cost. The on-off drive cycle of a typical compact wheel loader does not suit the after-treatment systems needed and therefore creates a unique opportunity to use an electric driveline.

Ulrich Fass

"In contrast to most construction machines, which typically operate continuously, compact wheel loaders are in a different business and run a significant share of the time in low idle," explains Ulrich Fass. "They also operate in environments which are more sensitive to exhaust and noise, such as urban streets or indoors. With the LX2, there is almost no idling – since it is electrically controlled, it shuts down automatically after a couple of seconds."

THE LX2 USES the same charging connection as the automotive industry and can be charged overnight using a regular household plug. A fully charged battery should be sufficient for a regular day's operation. However, for more demanding applications, it is possible to fast charge the battery.

Along with the EX2 electric compact excavator concept, the LX2 is part of Volvo CE's shift into electromobility, which is made possible by improvements in battery technology. At this stage, the LX2 is a concept vehicle, but it will provide necessary input to other product development plans.

"Five years ago, when we started this project, people would have said you were nuts if you suggest banning diesel – it was unimaginable," says Ulrich Fass. "But now many cities are in fact planning on doing just that, so it's fortunate that we have been persistent enough to now have an interesting concept. We believe in electromobility at Volvo CE and the impact it will have for a sustainable future. It's going to start in compact machines like the LX2." ■

Zero emissions

Populated by autonomous and electrified machines from Volvo CE, Vikan Kross is about to become the world's first emission-free quarry of its kind.

TEXT JIMMY HÅKANSSON **PHOTO** JONAS LJUNGDAHL

AT VIKAN KROSS quarry near Gothenburg, Sweden, the machines operate with precision and without coffee breaks. Rocks and rubble from a conveyor belt fill load carriers that stand in line to transport the material from point a to point b. When put in motion, it resembles a well-choreographed ballet. However, this is not your ordinary quarry operation. This is the first time ever that Volvo CE's Electric Site concept has run in a real-life production environment.

The aim is for Vikan Kross to become the world's first emission-free quarry, making it a showcase of engineering ingenuity and a milestone for electromobility and automation alike.

"There are several reasons why we chose Skanska's Vikan Kross quarry," says Uwe Müller, Chief Project Manager Electric Site, Volvo CE. "For one, it's a confined and safe area where we are in control and know the boundaries. Another reason is that the quarry calls for a repetitive transport solution."

Co-funded by The Swedish Energy Agency, the Electric Site is a major collaborative effort between Volvo CE, the construction and development company Skanska, and two Swedish universities. The mission statement is to achieve a 95 per cent reduction in carbon emissions and a 25 per cent reduction in total cost of operations. To achieve these goals, they needed not only to update the machines used in the quarrying – but also to reinvent quarrying itself.

Uwe Müller

"We realised fairly quickly that replacing the diesel tanks on the machines with batteries was not enough to streamline work in the quarry," says Andreas Sunesson, project manager for Electric Site at Skanska. "Instead, we needed to zoom out and ask ourselves what aggregate production actually involves. The answer: quarrying and reducing the size of stones. Everything else, like moving stones and putting them in piles, is a waste of time."

As an example of waste, Andreas Sunesson points to the pre-crusher, a machine that stands amid a pile of rocks, crushing big stones into smaller ones before sending them to a conveyor belt. From there, the stones fall from the belt and hit the ground. The next step is for the wheel loader to pick them up and load them onto a rigid hauler. On the Electric Site, the stones fall directly onto the HX2s, the fully-electric autonomous carrier loaders. And – as they are cabinless – they can form a seamless queue, which means the stones never hit the ground, eliminating the unnecessary step with the wheel loader.

Andreas Sunesson

Continued on page 22

The process in short

From the blast site, an excavator continuously feeds rock into the crusher, which reduces the rock to under 300 mm. The crushed rock is then dumped into an autonomous HX2 electric load carrier. When full, the HX2 transports the rock to a feeder tunnel, where it is then conveyed to the secondary crusher. On the way back, the HX2 stops at the charger for just one minute to get enough energy for another cycle. Since the rock crushers cannot stop, multiple HX2s are used to ensure a continuous production line.

Experience the Electric Site!

DOWNLOAD THE APP
VOLVO GROUP AR STORIES

Download on the App Store

GET IT ON Google Play

ILLUSTRATION: ALBIN NILSSON

The Electric Site team do a routine check-up on the Volvo CE's HX2 – the autonomous, battery-electric load carriers that transport the material from the primary mobile crusher to the secondary static crusher.

Compared with a 50-tonne hauler, the autonomous HX2 is slight in size. According to Uwe Müller, there is a reason why.

"Over the years, the machines have become bigger and bigger. This time, we are going the opposite way. If you want to go for efficiency and automation, you need to move away from the big, versatile vehicles towards smaller, dedicated machines."

TO MEET THE demands set by the Swedish government to become a carbon-neutral industry by 2045, all companies must take immediate steps. But the transformation is complex. As Sunesson says: "You can't simply slap a battery on a truck and call it a day". As the Electric Site shows, it requires a well-prepared infrastructure and better-planned operation.

"With diesel machines, you basically don't need any planning. All you need in the form of infrastructure is an average gravel yard and a diesel tank. The main difference is that the need for planning increases significantly – both in the long term, when it comes to investments in the infrastructure, and in terms of short-term detailed planning. After all, autonomous machines are stationary unless you tell them precisely what they need to do on every occasion and in every scenario," explains Andreas Sunesson.

Reinventing the quarrying process, which has looked pretty much the same for the past 50 years, takes more than a single player. Collaborating with the right people has been vital for the Electric Site project.

"Having the resources, knowledge and understanding of automation, electromobility and connectivity within the Volvo Group has speeded up the project," says Uwe Müller. "But partnership is crucial. We may have the machine knowledge, but Skanska have the day-to-day experience and the infrastructure. We couldn't have done this by ourselves."

AS FOR VIKAN Kross, it is business as usual. Whether the site is populated by electric and autonomous machines or not, it must still produce 750 tonnes of aggregate per hour. Taking

Volvo CE's LX1 is a prototype electric-hybrid wheel loader that cuts fuel consumption by about 50 per cent, compared with its conventional counterparts.

the concept from a test environment to a real site means that the machines will be subjected to weather conditions, repositioned satellites and other circumstances that are hard to predict. But it also shows something more important. It shows that a carbon-neutral and emission-free society is possible.

"It's necessary for us to demonstrate the Electric Site on a large scale. Because, if you can't show it, people won't trust it," says Uwe Müller. "I hope that this will inspire the industry and show that we all need to play a part in the bigger picture. If we can spark something and aim towards a more sustainable future, we will all benefit from it – and our kids will as well." ■

THE ELECTRIC SITE IN NUMBERS

750 tonnes of aggregate will be produced every hour

95 per cent targeted reduction in CO_2

25 per cent targeted reduction in total cost of operations

203 million SEK investment

5 partners: Volvo CE, Skanska, The Swedish Energy Agency, Mälardalen University and Linköping University

3 types of prototype machines: LX1, electric-hybrid wheel loader; HX2, autonomous battery-electric load carrier; EX1, dual-powered, cable-connected crawler excavator

HELLO

Per-Erik Lindström, Vice President Global Key Account Management Sales, Volvo CE

Per-Erik Lindström

Which commercial opportunities can Electric Site open up?

"It is going to change the conditions for many industries that require repetitive transport. We are testing the concept in a quarry, but it can just as easily be used in a mining environment or for materials handling in an industry. We can offer these customers a solution that is carbon neutral and cuts costs by up to 25 per cent."

Can you describe the business model?

"The business model will be a package solution in which we sell uptime and capacity. Instead of purchasing individual machines, customers pay by the hour or produced tonne. This enables them to release capital to invest in their core businesses."

Which challenges does this involve?

"To sell a specially adapted transport solution, you need to understand the customer's needs and processes. This then necessitates close collaboration with customers and an in-depth understanding of their processes. This is completely different from selling an individual machine. It requires more of the sales staff, but it also helps to create a stronger, deeper relationship with the customer." ■

WHAT IS CTO OFFICE?

Many of today´s societal challenges are expected to be solved by technology development. In order to fully leverage the Volvo Group's R&D investments, it is necessary to strengthen the alignment of the research, technology and regulatory agendas.
Through internal and external collaboration, the CTO (Chief Technology Officer) Office will be instrumental to the Volvo Group in order to drive the research, technology and regulatory agendas, assure technology partnerships and research collaborations and to guide the transformation needed to address future challenges.
The CTO office was set up in the beginning of the year.
It has approximately 60 employees in Sweden, France, the USA, India, Poland, Brussels and China.

NIKLAS GUSTAVSSON, HEAD OF CTO OFFICE

"We can't do it on our own"

From sustainable mining in the north of Sweden to transport solutions in California. Through partnerships the world over, the Volvo Group is creating innovations to overcome major challenges facing society.

TEXT LINDA SWANBERG **PHOTO** SAMUEL UNEUS

AS HEAD OF the CTO office, Niklas Gustafsson spends much of his time on the road. He has dialogues with stakeholders all over the world and is a popular speaker at conferences at which climate issues and other societal challenges are on the agenda. Today, he is in Stockholm to talk about sustainability with LKAB, a high-tech mining and mineral group owned by the Swedish state. Earlier this year, the Volvo Group and LKAB, together with a number of other companies, entered into a partnership to develop a new global standard for sustainable mining.

Why is it important for the Volvo Group to be included in this kind of partnership?

"Society is facing a number of major global challenges that impact the transport sector. In parallell, businesses and industries are facing challenges transiting into the 4th industrial revolution. To find solutions that really make a difference, we need to collaborate closely with society stakeholders, as well as with other companies. This also impacts our long-term competitiveness. It is no longer enough to produce the best, most efficient trucks. We also need to find partnership settings in which we can be involved and deliver complete transport system solutions. We can't do it on our own."

Could you give us an example of system solutions of this kind?

"Charging infrastructure for electric vehicles is an example where we need to collaborate with others. The success in launching electric vehicles is obviously dependent on supporting customers and customers' customers with a full system solution, regardless of which stakeholder actually builds the charging infrastructure. And there are several system challenges such as this when looking at the coming transport solutions which will, stepwise, be automated, electrified and connected."

A brief meeting with the colleagues in the management team. From left to right: Urban Wass, SVP Research & Innovation Policy, Helene Niklasson, VP Research & Technology Office, Niklas Gustafsson, Head of CTO Office, and Niklas Wahlberg, VP Societal Challenges and Solutions.

Since January this year, you have been head of the CTO office. What do you actually do?

"The CTO office is a way of gathering and linking parts of the Volvo Group in different areas that are involved with society contacts, partnerships, regulations and advanced engineering. We ensure that we invest our research funds in a good way and that they are linked to the efforts being made in society, thereby teaming up with other co-funding partners.

"The Volvo Group is a company with high credibility and many stakeholders are eager to collaborate with us. It's our job to assess the players and work out who we can achieve something really important with. Our target is to spread technologies and solutions that can tackle societal challenges more rapidly, effectively and sustainably."

How far do you think the Volvo Group has come?

"The solutions we have developed in the fields of automation, electromobility and connectivity will be able to make a real difference, not least when it comes to air quality, traffic safety and efficiency. We also have many top-class, exciting partnerships in the pipeline. Our solution partnership with LKAB in northern Sweden is just one example. We have also started an extremely exciting partnership on electric vehicles in California (see page 27). Finding partnerships of this kind will help us strengthen our business models, utilising public funding opportunities and finding more business and new customers."

What is needed for the Volvo Group to succeed?

"We need to have courage to enter into dialogue and partnerships without always

"It's our job to assess the players and work out who we can achieve something really important with."

NIKLAS GUSTAFSSON, HEAD OF CTO OFFICE

knowing from the start what our role is going to be and what we are going to contribute.

"Large partnerships often involve complications and a really large group of people around the table, but we can show both to ourselves and to others that it's worth it. It's largely a question of changing the way we think and work."

What are the challenges?

"In the past, things were generally regulated by legislation at national, or in Europe's case, EU level. Nowadays, rules are increasingly local. For example, a number of cities have introduced their own regulations when it comes to emissions and the type of transport that is permitted in cities. For us as vehicle manufacturers, this is a huge challenge that calls for close dialogue with players at many different levels.

"Another challenge is to stay innovative internally within the Volvo Group as well as with external partners and start-ups. To secure we have the right innovation culture, the Volvo Group is now establishing CampX, which will be driven by the CTO Office (see page 36).

What trends do you envisage in the future?

"Well, historically, the environmental organisations have been largely responsible for pushing politicians to step up the legislation and this has then impacted our products. This is no longer always the case. As technology developments are taking place at such an incredible rate, we sometimes take the lead and pull other parts of society along. This is something I think we are going to see more of. As trusted industry representatives, we can't be afraid to take responsibility for the possible societal changes this new technology might instill." ■

New partnership will reduce emissions

Over the next three years, the Volvo Group will take part in an innovative partnership in California, USA. Using electromobility and smart technologies, the project aims to reduce greenhouse emissions and improve public health.

THE VOLVO LIGHTS (Low Impact Green Heavy Transport Solutions) project is an example of a new form of public-private partnership. The project includes 16 partners, including California's South Coast Air Quality Management District (SCAQMD) and industry leaders in transport and electric charging infrastructure.

The California Air Resources Board (CARB) has preliminarily awarded 44.8 USD million for the project with the aim of transforming freight operations at the facilities of two of the top trucking fleets in the United States. The project is part of California Climate Investments, a statewide initiative that puts billions of Cap-and-Trade dollars to work reducing greenhouse gas emissions, strengthening the economy and improving public health and environment, particularly in disadvantaged communities.

During 2019, Volvo Trucks will introduce all-electric truck demonstration vehicles and is set to commercialise them in 2020. A variety of smart technologies will be used – including remote diagnostics, geofencing and Volvo Trucks' web-based service management platform.

"This is an excellent opportunity to show the end-to-end potential of electrification," says Peter Voorhoeve, President of Volvo Trucks North America. "From solar energy harvesting at our customer locations, to electric vehicle uptime services and potential second uses for batteries, this project will provide invaluable experience and data for the whole value chain."

The project will reduce an estimated 3.57 tonnes of criteria pollutants (defined air pollutants) and 3,020 tonnes of greenhouse gases annually.

What is the state of the commercial vehicle industry? Here is a snapshot of what some of the Volvo Group's competitors were showcasing at the recent IAA trade fair in Hanover, Germany.

TEXT TOBIAS WILHELM

Stiff competition

Scania

Scania signalled that biofuels will lead the way to a fossil-free transport system. This was reflected in the range of vehicles on show which included biodiesel, LNG, CNG, HVO and plug-in hybrid vehicles. Scania's plug-in hybrid truck on display offered an electric range of 10 km. Through geofencing technology, its full-electric mode is turned on in zones with speed, noise and emissions restrictions. On the bus side, the full-electric Scania Citywide and the Interlink MD were introduced. The Interlink MD is the first long-distance coach which runs on LNG. The eHighway, a joint project with Siemens, was also on display. The project uses hybrid trucks that can run on electricity through a pantograph mounted on the vehicle that connects to overhead power lines.

MAN

MAN presented a Level 4 automation project which is designed to allow a truck to autonomously follow another truck, for example, in highway maintenance applications. The solution was developed over a period of four years, with the support of the German Ministry for Economic Affairs and Energy. Meanwhile, the vehicle maker also presented the MAN CitE, an electric concept truck that has a 320mm low entry and a 360-degree camera system, features that are designed for last-mile delivery tasks in urban city centres. MAN presented a range of diesel, gas, hybrid and full-electric solutions for both trucks and buses.

IAA

The IAA is the world's biggest trade fair for commercial vehicles. It features more than 2,100 exhibitors from 50 countries.

PHOTO: TOBIAS WILHELM, SCANIA, MAN, MERCEDES, DAF

DAF

Paccar-owned DAF showcased its LF Electric and CF Electric tractors for medium- and heavy-duty urban distribution and the CF Hybrid for medium-range distribution. The first CF Electric models will be field tested this year. DAF plans similar field tests with the LF Electric and CF Hybrid in 2019.

Iveco

Iveco showcased a 100 per cent diesel-free stand, with a full commercial offering of trucks and buses mainly focusing on CNG and LNG. Natural gas is popular in Iveco's home market, Italy, due to the country's dense natural gas distribution network and comparatively low fuel prices.

Mercedes

Mercedes introduced the new Actros long-haul truck, with 60 new features, including improved active safety and a multimedia cockpit, where all switches and buttons had been replaced by two displays. In the truck, side-view mirrors have been replaced by a camera, which helps all-round visibility for the driver and reduces air resistance. New technology from the Actros is expected to be introduced in other Daimler Group brands like Freightliner and Fuso.

On the bus side, the Mercedes Citaro Hybrid was highlighted, as well as its full-electric version, the eCitaro, for which series production will start at the end of 2018. The eCitaro features new active safety systems like Brake Assist and the Sideguard Assist optional feature that warns drivers of potential collisions with pedestrians and cyclists. Mercedes also announced a strategic cooperation with California-based electric bus manufacturer Proterra.

NEW ENTRANTS

Ford Trucks

The Ford F-Max was introduced as a new contender in the heavy-duty segment, a cab-over-engine truck that will hit the international markets in 2019. The Ford F-Max's powertrain is a diesel engine paired with a gearbox produced by ZF. The truck is built by a Ford Otosan, a Turkey-based manufacturer that is partially owned by Ford.

BYD

Chinese BYD made its second appearance at the IAA and unveiled a modular electric bus and an articulated electric bus featuring overhead pantograph charging. BYD started out as a battery producer. Today, it is the world's largest manufacturer of electric vehicles with over 35,000 electric buses delivered worldwide. The company has assembly plants in the EU, the US and Brazil and, with its new modular manufacturing concept, it claims to cut lead time, the number of components and vehicle weight.

Technology is continuously making our daily lives easier and the workplace is no exception. Here are three cutting-edge innovations that offer huge potential for helping Volvo Group employees.

Working in VR

The hand controls are transformed into work gloves. Suddenly, there is a truck engine in the centre of the room and is it quickly joined by tools and parts. Welcome to the virtual reality of a service technician.

TEXT LINDA SWANBERG **PHOTO** IAN WALLMAN & VOLVO GROUP

WHEN 40 TEAMS from all over the world competed for the trophy in this year's VISTA final, one of the work stations involved replacing the common rail in a truck engine. In just 30 minutes, the teams had to change the valve cover, undo bolts, remove contacts and install a new common rail. However, instead of repairing an engine in a real truck, the teams had to complete the task in a virtual environment.

"Even though it was difficult to complete the assignment in the appointed time, this was the most popular station in the final. Many of the competitors had not had any contact with VR (Virtual Reality) before and they thought testing something new was great fun," says Anders Abrahamsson, Planning Manager Technical Training and Driver Information.

His job includes planning training, first and foremost for service technicians at Volvo

During the finals and semifinals of VISTA, a total of 230 teams had the opportunity to test Virtual Reality.

Trucks. Keeping a check on new technology and integrating it is an important part of his job.

"Many of the new service technicians are young and they're used to learning things in a different way. So we need to create training that is both enjoyable and interesting. VISTA felt like a good platform for us to test VR technology and it's great that we received such a positive response."

A TOTAL OF 230 teams were given the chance to test VR during the semi-finals and finals. Together with his colleagues, Anders Abrahamsson is now going to evaluate the results from VISTA and think about ways of integrating VR in training courses. The first step will be to make sure that the equipment that already exists can be used at Volvo Trucks' training centres.

"Using digital tools, we can make the training more effective. For example, with VR it's possible, just like the participants did at the work station in the final, to dismantle large components like engines and transmissions without needing to have them in physical form," he says.

Footnote. VISTA (Volvo International Service Training Award) is an international competition for all the employees in Volvo Trucks' and Volvo Buses' global service network.

FACTS ABOUT "DAISY"

Manufacturer: Universal Robot
Reach: 1,300 mm
Payload: 10 kg
Weight: 29 kg

My co-worker is a robot

In the Vénissieux engine plant in France, a bold new step has been taken in the evolution of man/machine interaction.

TEXT JIMMY HÅKANSSON **PHOTO** NICOLAS DARTIAILH

SINCE THE EARLY 1960s, robots have been a mainstay of the manufacturing industry. By working in hazardous environments and lifting heavy and dangerous objects, the machines have proven to be useful tools. But at the GTO Vénissieux engine plant, France, the robot is more than just a tool.

The team behind the coactive robot, from left to right: Mickael Nauleau, Audrey Lehu, Patrick Marenthier and Cedric Marcelat.

"This is a collaborative robot which is completely different from a conventional robot. Due to new regulations and technology, this robot can work in the same station, at the same time, as the operator," says Mickael Nauleau, Manufacturing Engineer Project Manager.

Whereas a traditional robot needs fences and safety distances to operate securely, the coactive robot is equipped with sensors that detect contact between man and machine, allowing it to work alongside an operator.

FOLLOWING THE VÉNISSIEUX engine plant vision "VNX 4.0", the coactive robot is meant to increase productivity at the plant, as well as improving the work environment and ergonomics for the worker. Earlier this year, the robot was tested as a prototype at the Vénissieux Plant, where it performed tasks that can be harmful for a human operator. While the robot lifted heavy parts and tightened screws and bolts on the engines, the operator could focus on other assembly activities.

"We had three goals with the prototype test. The first was to confirm the efficiency in terms of technology, the second was to make a pre-risk assessment and the third was to change the mindset for everyone working and interacting closely with robots. We wanted to show them that it's perfectly safe to work alongside this robot," says Mickael Nauleau.

BEFORE IMPLEMENTING THE new generation of robots in the workplace, it was important to address employees' fears and preconceptions. Is it safe to work next to a robot? After the initial trial period, the answer was unanimous: yes!

"When they told me that I would be working closely with a robot, I had some fears because of the change. But, thanks to my involvement in the project team, I'm now confident that this robot will make my work easier," says Cédric Marcelat, Production Team Leader.

Quality Engineer Audrey Lehu concurs:

"For an operator, it's a huge benefit to work together with a robot that can do the repetitive and tough assignments for them. While the robot performs the menial tasks the operator can perform other operations and think about how to improve the processes," she says.

The next step for this coactive robot is to be fully integrated in the plant. As the first implementation at Venissieux Plant appears promising, they are already thinking about adding more robots of the same type. And the operators have given the robot a warm welcome to the workplace family.

"Right now, we are discussing which name we will give it," says Mickael Nauleau, then adds: "We're leaning towards Daisy."

"When they told me that I would be working closely with a robot, I had some fears because of the change."

CÉDRIC MARCELAT, PRODUCTION TEAM LEADER

VÉNISSIEUX ENGINE PLANT

Number of employees: 700

Engines produced annually: 55,000

Operations: Assembles 5- to 11-litre engines for all Volvo Group applications: trucks, coaches and buses, construction equipment, marine and industrial engines.

"This is an innovative technology and I'm really proud to work on it. It's impressive to see easy collaboration between robot and operator," says Patrick Marenthier, Maintenance Team Leader.

VNX 4.0

VNX 4.0 is the name of the target image for the Vénissieux Engine Plant. It encompasses the evolution towards the digitalisation of the production system and the link with Industry 4.0.

Anderson Prado works on the F line and he is one of the workers who has tested the exoskeleton suit, called Shoulder X.

Taking the weight

Futuristic-looking exoskeleton suits are giving the employees at the truck plant in Curitiba, Brazil, an extra boost.

TEXT JIMMY HÅKANSSON **PHOTO** VOLVO GROUP

LIFTING HEAVY PARTS and working long periods of time in uncomfortable positions takes its toll on the body. In an effort to improve ergonomics and increase quality of life, employees on the HDV and MHDV lines, materials handling and cab production areas at the Volvo Group plant in Curitiba, Brazil, have tested different types of exoskeleton suits.

"It all started when we realised that we needed to offer better comfort to our employees," says Henrique Brasileiro, Logistics Engineering Manager, Group Trucks Operations, GTO. "After

we identified the working positions that were in biggest need of ergonomic support, we initiated a benchmarking process. Then we took some photos of the work stations and sent them to a supplier of exoskeleton suits."

After evaluating the work conditions, the supplier returned with a range of exoskeleton models that could benefit operations. From this selection, Henrique Brasileiro and his colleagues settled on two different models, one for supporting the back and one for supporting the shoulders.

ONE OF THE logistics engineers assigned to implement the exoskeletons was Renata Jabs.

"At some work stations the operators could spend quite a lot of their time with their arms above their shoulders. And, if hold your arms above your shoulders for a long time, you will start to feel serious pain," says Renata Jabs.

Equipped with the exoskeleton suit, the wearer looks like he or she just ran off a sci-fi movie set. But the suit is not just for show.

What is an exoskeleton suit?

KNOWN FROM MOVIES such as *Aliens*, *Avatar* and *Iron Man*, exoskeleton suits are a wearable technology that can increase the users' strength and endurance. Today there are several different types of exoskeleton suits with just as many fields of application. Most commonly, they are used in a medical or industrial setting. While some suits help rehabilitate patients recovering from strokes and spinal cord injuries, others improve ergonomics for factory workers to avoid strain and fatigue.

PHOTO: PNGIMG.COM

"An operator wearing the Back X suit can lift 14 kilos without even feeling it."

RENATA JABS, LOGISTIC ENGINEER ASSIGNED TO IMPLEMENT THE EXOSKELETONS

The core team behind the tests in Curitiba, Brazil. In the middle, and wearing the exoskeleton suits, are Valdiney Freitas and Anderson Prado.

"An operator wearing the Back X suit can lift 14 kilos without even feeling it," says Renata Jabs.

The other suit used in production is called Shoulder X and lets the operator fixate his or her arms in a set position, for example, enabling the operator to work with arms above the shoulders without straining the muscles.

One big challenge has been to find areas where the exoskeleton can be applied. While some operations work well with the suits, others do not.

"If you work at a station where you need to walk a lot, you will get tired if you are wearing an exoskeleton suit that adds an extra five kilos to your weight. But, at static stations, and when you need to lift some heavy loads, the suits have proven very useful," says Henrique Brasileiro.

ANDERSON PRADO ASSEMBLES trucks on the F line and he is one of the workers who have tested the exoskeleton suit.

"For a specific assembly, I would sit for a while with my arms raised and the device reduced any discomfort caused in the process. It also reduced my tiredness at the end of the work shift," says Anderson Prado.

The evaluation is still an ongoing process. At the turn of the year they might know when and where – or, more likely, if – the suits are suited for the job. Even though the exoskeletons are a bit cumbersome, Henrique Brasileiro compares the wearable technology with that of cell phones.

"The evolution of the materials will make the suits lighter and easier to adapt and use. It's like a cell phone. The first one was heavy, but it got lighter and now you can't think of leaving your home without it," he says.

PHOTO: VOLVO GROUP

The base for CampX is in Gothenburg, but the CampX methods are global and will be used at several Volvo Group sites.

OPEN FOR CO-CREATION

New technologies and business models will profoundly change the industry within the coming decades. To adapt quickly enough, a different approach is needed, which is why CampX by Volvo Group is being created.

LOCATED AT CAMPUS Lundby in Gothenburg, CampX by Volvo Group will be an innovation arena that will bring together people from different parts of the Volvo Group, as well as external partners, to explore and accelerate both technology and business ideas in a spirit of entrepreneurship.

"The main purpose of CampX by Volvo Group is to increase the speed in the transformation towards disruptive global business models and technologies, thereby focusing on electromobility, automation and connectivity with cross-functional collaborations," says Lars Stenqvist, Chief Technology Officer. What makes CampX really unique is that it brings together internal experts with external competences in the same area.

Working with all three disruptive technologies will help projects build on the common links between them. Speed will be increased as cross-functional teams, with access to physical test equipment and facilities, will have their workplace at CampX. These strategic initiatives will invite further cross functional competences from time to time as identified. "The Volvo Group is at the front line when it comes to these emerging technologies, but it will be increasingly important to work with an ecosystem of partners and collaborate with actors outside the traditional automotive sector, in order to increase the speed of innovation," says Ann-Sofie Wulfsberg, Project Manager for setting up CampX by Volvo Group. "We need a more entrepreneurial culture, to be able to capture the best ideas from within the organisation and systematically search for external ideas and new business opportunities. One answer to these challenges is CampX by Volvo Group."

CampX by Volvo Group is expected to be ready by early 2019, with an official inauguration at the end of March. Visit the CampX by Volvo Group page on Violin for updates and more information. ■

NIC TOWNSEND

A milestone in 3D printing

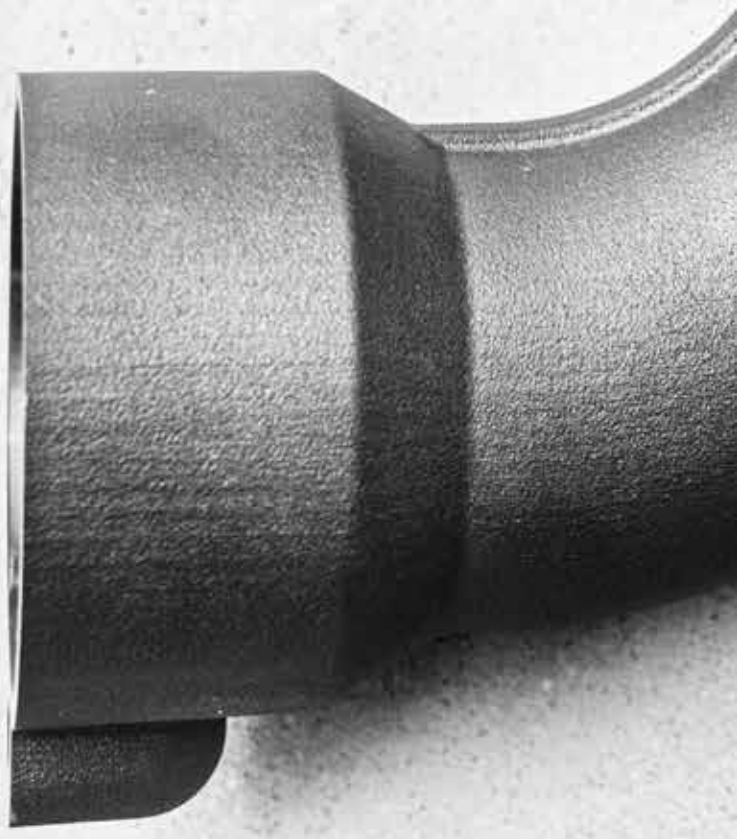
This 3D-printed tube bend is a major leap forward for the Volvo Group. It is also the beginning of a digitalisation process that could rewrite the rules for the service market and manufacturing industry alike.

TEXT JIMMY HÅKANSSON **PHOTO** SANNA TEDEBORG

THE NOZZLE MOVES backwards and forwards and joins layer after layer of plastic. Slowly but surely, an object is created from nothing.

"This is a straightforward printer for home use, but the principle is the same regardless of whether you use a hobby printer or a 3D machine for industrial production," says Christian Johansson, Head of Innovation and Concept at Service Market Logistics, GTO.

Christian Johansson and his team have been working on 3D printing for a long time, but it is only now that they can see a breakthrough. The technology has become less expensive and offers higher quality. There are currently also specially produced printers that can print entire buildings.



ANDERS NILSSON, INNOVATION Manager at Service Market Logistics, holds out a 3D-printed gasket from Volvo CE which is currently used in construction machinery.

"The volume for this product is very small and that's what makes it ideal for 3D printing. The great thing about this technology is that it enables you to reduce storage space for products that are sold in small volumes and to store digital drawings instead," says Anders Nilsson.

This gasket is one example of a handful of 3D-printed parts that are used by the Volvo Group's customers. The truck industry estimates that, in 2025, it will be possible to produce 40 per cent of all truck parts in a 3D printer.

As far as the Volvo Group is concerned, a breakthrough took place earlier this year when a tube bend for Volvo


Anders Nilsson


Christian Johansson

Penta engines was printed – in aluminium. Not as a prototype but as a real product.

"Aluminium tube bends represent a major milestone for us in a number of respects. First of all, we are now able to print products in aluminium. Secondly, this tube is a critical component in Volvo Penta's engines," says Christian Johansson and he adds that 3D printers are now so reliable that they are able to print parts that are vital to engine function.

Anders Nilsson predicts that the technology will lead to other important changes. It will be possible to produce components on the spot whenever necessary, reduce the need for stock-keeping, increase the potential to adapt products individually and design components in a completely different way compared with what current production methods permit.

To illustrate how 3D printers can be used in the future, Christian Johansson describes a scenario on an oil platform in the Atlantic, where parts are delivered once a week by helicopter.

"What happens if a critical part fails a few days before the next parts delivery? Do you order a new helicopter for a single component? If, however, you have a good 3D printer on site, you can print the part when you need it. If you also have a pair of virtual reality glasses, you can receive instructions on how to fit the part yourself, instead of sending for a service technician," explains Christian Johansson.

3D PRINTING IS becoming more and more common across industries. Boeing is printing components for its aircraft and Formula 1 teams like McLaren and Renault Sport are using 3D printers to produce parts in the pits. Christian Johansson believes that the Volvo Group needs to keep pace with technological developments when 3D printers become a natural part of the manufacturing industry.

"This represents the digitalisation of the production process. The same forces that changed the conditions for the entertainment industry have now reached us. We need to be alert and ask ourselves how this is going to impact our industry. In the future, we shall perhaps not build products in one part of the world and then transport them to another. We may just need to mail a file," says Anders Nilsson. ■

FACTS

Volvo Group 3D-prints several different items, including plastic gaskets for Volvo CE's construction machinery, aluminium tube bends for Volvo Penta engines and tools used by Volvo CE's service technicians.

An electric boost

Last June, Volvo Penta set itself the ambitious target of being able to offer electrified solutions for both marine and industrial segments by 2021. Working closely with its customers and building on Volvo Group technology will be key to making it happen.

TEXT NIC TOWNSEND **PHOTO** ROBIN ARON

WHEN *VOLVO GROUP* *Magazine* last visited Volvo Penta's electromobility lab (see issue 5/2017), it was still in its infancy, sparsely furnished and housed in a temporary, isolated location with a handful of staff. Less than a year later, it is now a state-of-the-art workshop located at Volvo Penta's main test lab and just across the road from GTT's head office. It boasts a team of 20 engineers, who also work in close collaboration with the Volvo Group's 140-strong electromobility team.

"Our strategy is to start by reusing as much as possible from the Volvo Group's electromobility platform and it seems it will cover quite a large part of our customers' needs," explains Niklas Thulin, Director Electromobility, Volvo Penta. "The Volvo Group has invested a great deal in building these components and control systems, so we should reuse them where they fit. As we go into more unique applications, we will eventually develop additional components ourselves."

VOLVO PENTA'S CUSTOMER base covers a wide variety of different segments, yet one clear trend can be seen across them all – a growing need for cleaner, quieter and more fuel-efficient drivelines. Industrial applications, particularly material handling, is where Niklas Thulin sees the greatest potential. "The cost of ownership is reaching a point where it is more profitable to operate an electric machine rather than a diesel engine and this is when the market will really take off," he explains. Electrification is also becoming economically more feasible for commercial marine applications, especially vessels that travel short distances in environments subject to emissions legislation. When it comes to the

Niklas Thulin and Emelia Forsgård in Volvo Penta's new electromobility lab, which has grown and expanded rapidly over the past year.

"2021 will be a very good time to be in the market with a ready solution."

NIKLAS THULIN, DIRECTOR ELECTROMOBILITY, VOLVO PENTA

marine leisure segment, zero emission drivelines with low noise and vibration mean enhanced boating experiences.

THE CHALLENGE IS to adapt the Volvo Group's technology to suit Volvo Penta's many and varied applications. This was the motivation behind an internal reorganisation that resulted in improved collaboration between technological development and business development.

"We are currently working very closely with customers, to ensure we are developing suitable products for their specific applications," says Emelia Forsgård who, as Project Manager Engineering for the industrial segment of electromobility, is currently leading the first customer projects. "We are very experienced in our different segments, so by using that knowledge and putting it together with the Volvo Group's experience with electromobility, we can build up a very good modular platform for our applications. With that as a base, we will be able to provide tailored solutions for our customers."

THE VOLVO GROUP'S electromobility platform gives Volvo Penta an excellent head start, but the knowledge transfer is not one way. "By exposing this technology to different conditions and a wider range of applications, we can understand

Emelia Forsgård, Project Manager Engineering for the industrial segment of electromobility, sees many benefits to combining Volvo Penta's application knowledge with the Volvo Group's technological expertise.

Niklas Thulin worked with GTT's electromobility team before becoming Director Electromobility at Volvo Penta.

more about the system and its boundaries," says Niklas Thulin. "For example, if we need to find a new solution to meet a specific safety regulation, that knowledge can then help make other Volvo Group products safer too, at little or no cost."

As with all electrobmobility products, the key enablers – and challenges moving forward – are battery capacity and charging times. Over the past decade, the cost of lithium ion batteries has dropped dramatically, enabling the proliferation of new technologies such as smartphones, drones and electric bikes. However, further improvements will be needed before Volvo Penta's industries can make the full transition into electrification. Shorter and faster charging times, and easier accessibility to charging infrastructure, will also enable smaller batteries, which in turn will further reduce costs.

"This is really the key," says Niklas Thulin. "The lower the cost of batteries, the faster the transition. At this rate, we think electrification will really take off in the next few years, so 2021 will be a very good time to be in the market with a ready solution." ■

"We are currently working very closely with customers to develop suitable products."

EMELIA FORSGÅRD, PROJECT MANAGER ENGINEERING, VOLVO PENTA

Electromobility within the Volvo Group

VOLVO PENTA'S SHIFT into electromobility is building on the same platform that has been successfully developed and commercialised by other Volvo Group companies. It started with Volvo Buses, as city public transport applications were initially the most commercially viable segment. Following its success, the technology has been expanded into other industries and applications.

This is made possible by applying CAST (Common Architecture and Shared Technology). GTT develops complete driveline solutions, systems and components for the Volvo Group business areas and adapts them to their market and application needs. "By utilising CAST, as a Group, we can secure higher volumes and reduce the time to market," explains David Hellstedt, VP Electromobility, GTT. "This means Volvo Penta and other Volvo Group companies do not need to start from scratch. They can combine known technologies into a new solution and work more with system integration than component development. As a result, we are seeing new products reach the market much sooner."

MACK TRUCKS

Mack Trucks plans to deliver a full electric Mack LR refuse truck in 2019, which will be tested by the New York City Department of Sanitation.

NOVA BUS

The Nova Bus LFSe recently became the first all-electric bus to be approved by the US Federal Transit Administration.

RENAULT TRUCKS

Last July, Renault Trucks unveiled its second generation of all-electric vehicles, ranging from 3.1 to 26 tonnes.

VOLVO BUSES

Volvo Buses continues to be inundated with orders for its Volvo 7900 Electric bus and tested two prototype all-electric articulated buses last June.

VOLVO CONSTRUCTION EQUIPMENT

Volvo CE has unveiled two pioneering concepts: the EX2 fully electric compact excavator and the LX2 electric compact wheel loader.

VOLVO TRUCKS

In 2019, Volvo Trucks will start selling its two new all-electric models: the Volvo FL Electric and the Volvo FE Electric and commercialise electric trucks in the USA in 2020.

Docking made easy

Last June, during the Volvo Ocean Race stopover in Gothenburg, Volvo Penta successfully docked a 68 ft yacht using a new automated self-docking system. This is how it was done.

THE CORE COMPONENTS of the solution are a combination of sensors, GPS, Volvo Penta's Inboard Performance System (IPS), electric steering and advanced navigation processing power via the Electronic Vessel Control (EVC) system.

"The only extra components are the sensors on the dock and the boat – otherwise the majority of development involved reusing and fine-tuning existing functions and technology," explains Håkan Stigeberg, Director, Marine Segment, CPAC Systems.

In fact, self-docking can be seen as a logical extension of Volvo Penta's 'easy boating' philosophy. "The origins of self-docking go all the way back to when we developed electric steering and individual steerable drives with IPS," explains Anders Thorin, Manager, Product Planning Electronics, Volvo Penta. "This made joystick docking possible and later DPS (Dynamic Position System). By keeping the boat in the same position, this was really the first step in automation. We have now taken the next step by automating movement from standstill to a specific place."

THAT IS NOT to say developing the new solution was easy. "Trying to move a 68 ft yacht with decimetre precision, in water where everything is constantly moving, is really challenging," adds Håkan Stigeberg. "You think you are in control, but then you get a sudden gust of wind. We had to spend a lot of time fine-tuning all the algorithms to ensure the system was very responsive and stable." ■

NIC TOWNSEND

HOW IT WORKS

LOCAL POSITIONING SENSORS
Four sensors are positioned on the berth to help define the docking spot.

PHOTO: VOLVO PENTA

REVERSE RADAR
Located at the back of the vessel, the reverse radar is used to identify any obstacles that may be in its path as it reverses into the dock.

GPS ANTENNA
The GPS antenna communicates with the land-based sensors in order to position the vessel correctly.

ELECTRIC STEERING/ JOYSTICK CONTROL
Another long-standing Volvo Penta innovation that enables high-precision manoeuvring.

EVC
The EVC combines all the key components and functions – electric steering, propulsion, GPS navigation, DPS – to create the self-docking function.

IPS
Volvo Penta's ground-breaking propulsion system enables capabilities such as sideways and diagonal manoeuvring, as well as standstills – both essential for automated docking.

Jenny Elfsberg's calendar is full of meetings with potential partners in Silicon Valley and San Francisco.

At the heart of disruption

In Silicon Valley, it's all about speed, transparency and co-creation. *Volvo Group Magazine* accompanies Jenny Elfsberg, Director Innovation Lab US Hub, on a day at her new job.

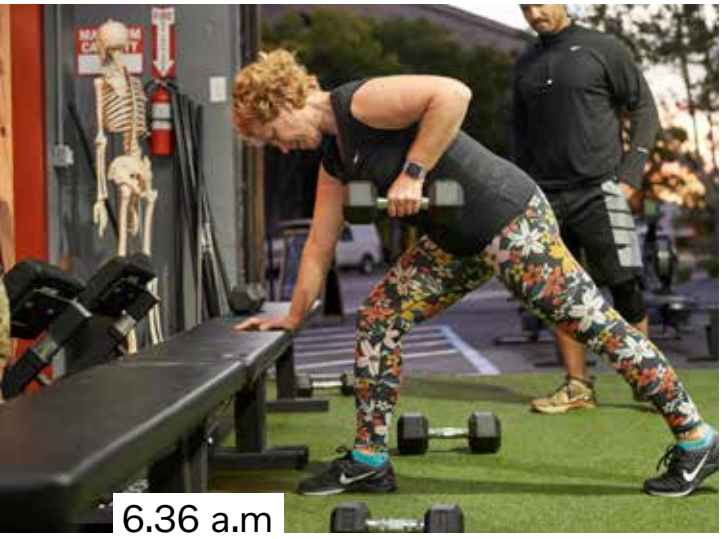
TEXT LINDA SWANBERG **PHOTO** JAY WATSON

WHEN THE INNOVATION Lab was looking for someone to head up its new office in California, Jenny Elfsberg was an obvious candidate. In her job at Volvo CE, she had collaborated closely with students at Stanford University and spent a lot of time in the region that has become synonymous with technological development and innovations.

"I really love working here. All the global players are represented in Silicon Valley and the rate of activity is incredible. The Volvo Group simply has to be established here if we are to be a part of the network and the digital ecosystem," she says.

AS DIRECTOR INNOVATION Lab US Hub, Jenny Elfsberg is employed by Connected Solutions, a division of Volvo Group responsible for driving the development of connected services and solutions. By setting up the Innovation Lab in Silicon Valley, the aim is to leverage external innovation, establish competitive partnerships and facilitate knowledge transfers.

"The whole of our industry finds itself in a disruptive phase and Silicon Valley is the centre of it. We can now take advantage of external innovation and co-create with the attractive players there, everything from start-ups to tech giants," says Anna Westerberg, SVP Connected Solutions.



6.36 a.m

Three days a week, Jenny Elfsberg starts with an early session at the gym located close to her home in Palo Alto. “We are a small group of ten people with two instructors who train together. For me, training is a way to feel better both physically and mentally. It is also social and fun.”

8.26 a.m

To be part of the digital ecosystem in Silicon Valley, speed is essential. “This applies not only to technological development but also in other areas. At the Volvo Group, you can wait three weeks to answer an e-mail. That would never work here! At the same time, everyone is really generous when it comes to collaboration. Skills and money aren’t a problem either. It’s always possible to find a solution if you have a good idea.”

9.10 a.m

To begin with, the Innovation Lab is renting office space at the Nordic Innovation House in Palo Alto, where there are representatives from start-ups and companies from the Nordic countries. “This is the perfect start. There’s a network here and colleagues I can discuss fun solutions with every day.”

Jenny Elfsberg is the first employee at the office and she will gradually set up a team with a variety of skills. Together with partners and customers, they will rapidly develop and test new digital solutions and services that create customer benefits.

THE PLAN IS to also give employees from other parts of the Volvo Group the opportunity to work in California on temporary assignments or projects and then take the knowledge back to the organisation.

“We have a lot to learn from Silicon Valley when it comes to innovations, working methods and new business models. In addition to driving transformation, I believe the new office is going to help us attract new talent. Having a presence in Silicon Valley will make us an attractive employer in other places,” says Anna Westerberg. ■

11.24 a.m

In her previous role at Volvo CE, Jenny Elfsberg worked on innovation projects together with the Design School at Stanford University. She is now continuing the partnership. Here, at a meeting with Tamara Carleton, Bill Cockayne och Eric Byler, Stanford associates at the course ME310, a collaboration in design thinking that involves students in both Sweden and the USA.

JENNY ELFSBERG

Joined the Volvo Group in 1998 while completing her degree project at Volvo Powertrain. She has worked with engine and software development in many different roles. 2009–2018, she was Director Emerging Technologies at Volvo CE and led a team of research engineers who evaluated new technologies and developed new concepts.

1.32 p.m

On a visit to Stanford, one of the world's most prestigious universities, with Aravind Kailas from the Volvo Group CTO office in the USA. "Aravind has a lot of competence within Internet of Things. Here we are talking about research connected to the work we do with students from Stanford."

3.43 p.m

Networking is essential for everyone working in Silicon Valley. Since Jenny Elfsberg started her job in California, she has received a lot of enquiries and invitations to different events and meetings. This afternoon, she meets Ido Levy, CEO for a start-up working on driver behaviour and traffic safety, at a café in San Francisco.

The global centre of tech innovation

Silicon Valley refers to a region in the southern San Francisco Bay Area in California, USA. It stretches from Monterrey to Santa Rosa and covers an area of roughly 120 km2.

Silicon Valley is a well-known global centre of technological innovation and many of the world's largest technology companies, including Apple, Google, Facebook, Intel and Netflix were started and are headquartered here.

It is also home to a myriad of start-ups and accounts for one third of all of venture investment in the United States.

Palo Alto is a small city with a population of less than 70,000, but it serves as headquarters to a number of high-technology companies, including Tesla, Hewlett-Packard and Skype. It is one of the major urban centres in Silicon Valley and the home of Stanford University.

The city got its name from a coastal redwood tree and Palo Alto means "tall tree" in Spanish.

ENGINEERING INGENUITY

Since its introduction to North American markets, the Volvo Group's turbo compound diesel engine is proving to be among the cleanest and most efficient in the industry.

TEXT NIC TOWNSEND **PHOTO** PATRICK DALY

WITH EMISSIONS LEGISLATION becoming increasingly strict, and the ever present need to reduce operating costs, manufacturers are under growing pressure to reduce CO_2 emissions and fuel consumption in their vehicles. Despite the progress that has been made within electromobility and other alternative fuels, when it comes to long-haul transport, no fuel looks likely to replace diesel any time soon. So that leaves one option: making diesel engines more efficient.

Last year, in North American markets, Volvo Trucks launched the D13 TC engine, while Mack Trucks introduced the MP8 SEHE (Super Econodyne High Efficiency). By adding a turbo compound unit and high-efficiency turbo charger, the new engines are able to recover waste heat to improve fuel consumption by up to 7.5 per cent compared with the previous models.

"AS THE VOLVO Group, we have a lot of different products and technologies, but we don't always combine them as well as we could," says Timothy Suder, Senior Adviser, Powertrain Engineering. "But in this case, we did. We took a well-known technology, we developed an extra piece – the turbo compound – with our in-house experts and we put it together with the I-Shift. This amplified the strengths of both technologies."

The D13 TC and MP8 SEHE engines have already proven hugely successful, with many

Founded in 2012 by Vlad Vinnichuk and his father, VTS's fleet has grown to over 150 trucks, with 44 owned by the company and the rest owner-operated. ▶

VTS recently purchased eleven new VNL 760s, each equipped with the fuel-efficient D13 Turbo Compound engine.

Legislation for CO_2 emissions

HAVING SUCCESSFULLY reduced nitrogen oxide (NOx) emissions to virtually zero, governments and regulators are now turning their attention to CO_2 emissions. Both the European Commission and the US government have implemented new legislation which will have a profound impact on the industry in coming years.

US

The Environment Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) have introduced phase two greenhouse-gas emissions and fuel-efficiency standards for medium- and heavy-duty vehicles from model years 2018 and onwards. It is expected that the new standards will reduce CO_2 emissions by around 1.1 billion tonnes.

EUROPE

As of 1 January 2019, heavy-duty truck manufacturers will be required to issue declarations for CO_2 emissions and fuel consumption for every new vehicle produced in the EU. The EU Commission has also proposed targets of a 15 per cent reduction in CO_2 emissions from heavy-duty vehicles by 2025 (compared with 2019 levels) and 30 per cent by 2030. The decision will be made by the end of 2018.

In addition to Volvo Trucks' D13 TC engine, the Volvo Group's turbo compound technology is also used in Mack Trucks' new MP8 SEHE engine.

customers reporting significant fuel savings, often exceeding what was promised.

Vlad Vinnichuk, founder and owner of VTS Transportation in California, was one of the first customers in the US to purchase Volvo VNLs with D13TC engines. "For me, it came down to two simple promises: more efficiency, more power," recalls Vlad Vinnichuk. "I couldn't believe how well it performed. When you see savings of ten cents a mile, you realise the D13TC is just a good investment."

As an added benefit, many of VTS Transportation's drivers have been similarly impressed by the D13TC engine, claiming it is quieter and more powerful. "A couple of our drivers who had been doing this for a while were planning on quitting the industry altogether, but, when they got the new Volvo trucks, they suddenly changed their minds," claims Vlad Vinnichuk.

Building on this success, GTT has now developed an updated version and is currently running field tests. "For the first phase, we purposely focused on a very narrow application: long-haul trucks with I-Shift," says Timothy Suder. "It was the right way to go because it meant we could focus on introducing a really good product. For the second phase, we have made updates and expanded the operations it can be used in."

THE CUMULATIVE EFFECT of these updates is to further improve the overall efficiency of the engine and broaden its operational map.

"In the first phase, we forecasted a three per cent improvement in fuel consumption, which was validated by our field tests and customers – in fact most customers are seeing higher savings than that," adds Timothy Suder. "In this next phase, we are aiming to add another significant reduction."

"The feedback we are getting from drivers and customers is very positive," says Andreas Bruhn, Project Manager Engineering, GTT. "The fuel consumption figures are good. Some fine tuning is still ongoing to get the driveability exactly where we want it to be. It runs on lower RPMs, it's much quieter and has more than enough power for its operations. Overall, we think it will set a new standard in the premium segment." ■

PHOTO: VOLVO GROUP

YEAR: **1954**

Bringing turbo to trucks

ON ITS RELEASE in 1951, the L395 Titan was Volvo Trucks' largest truck to date, but Volvo's engineers wanted to increase engine output even further without significantly increasing weight or fuel consumption. The answer was turbo technology, which at the time was only used in ships, locomotives and aircraft. Volvo Trucks was the first manufacturer to design a turbocharger small enough to fit under the bonnet of a truck, which increased output by 35 bhp (150 to 185 bph) while only adding 25kg.

This led to the launch of the L395 Titan Turbo in 1954. Following its success, turbo engines were introduced for small and medium trucks as well, while competitors rushed to catch up. Soon it became the industry standard, with Volvo Trucks producing its last non-turbocharged truck in 1980. ■

JOINING FORCES

By consolidating the global production of all medium-duty engines at one plant, the Volvo Group has reduced costs without compromising on quality. It has also strengthened its alliance with Eicher Motors Ltd., a valuable joint venture partner.

TEXT NIC TOWNSEND **PHOTO** KIRAN NAMA

FOR THE VOLVO Group, one of the main advantages of forming joint ventures is the opportunity to combine the different strengths of two companies. VE Powertrain (VEPT) in the north of India is a perfect example of this synergy.

"At the Volvo Group, we are very strong when it comes to technology, but our volumes in India are generally not large enough to effectively leverage with suppliers," explains Edwin Paulraj, SVP Technology, GTA & JVs. "Eicher, on the other hand, is one of the largest manufacturers of commercial vehicles in India, with a very strong supplier base, which we can tap into through our partnership. In short, the VEPT plant allows us to combine our technological strength with Eicher's frugal engineering and cost-effective production, so that we can produce the same high quality engine at a significantly lower cost."

It is estimated that, by consolidating production in India, the Volvo Group reduces its engine costs by around 30 per cent, due to a combination of improved economies of scale and greater purchasing power with suppliers. Within the Indian domestic market, one of the largest automotive markets in the world, localised production also means the Volvo Group benefits from reduced logistics costs and customs duties.

CURRENTLY, THE MODERN engine plant manufactures five- and eight-litre MDE engines for the Indian market to match emission norms BS III to BSVI (from 2020) and the Volvo Group's requirements for Euro 3 to Euro 6. Engines from this plant are shipped all over the world to various Volvo Group sites for final assembly. The largest recipient is GTA & JVs, which uses both engines in UD Trucks' Quester and Croner models. Another major recipient is the Volvo Group's plant in Vénissieux, France, where the engines are used in Renault Trucks' and Volvo Trucks' medium-duty models. Engines

VE POWERTRAIN (VEPT)

Location: Pithampur, Madhya Pradesh, India
Inaugurated: 2013
Production: MDE5 and MDE8 engines, to meet global emission levels for the Volvo Group.
Capacity: Currently around 50,000 engines are produced per annum, with plans to increase to 100,000 units.

Engines manufactured at the VEPT plant are used in products for Eicher, UD Trucks, Volvo Trucks, Volvo Buses, Volvo CE, Volvo Penta and Renault Trucks.

Edwin Paulraj

are also delivered to Volvo Buses, Volvo CE and Volvo Penta.

"According to our customers, it's one of the best engines in the market and it's very versatile," adds Edwin Paulraj. "It is powerful, fuel efficient and modern, and it can achieve a wide range of horsepower just by changing the software and some hardware. The quality – translated in terms of durability and reliability – is amongst the highest in the market, which also results in a low fault frequency."

The VEPT plant was inaugurated in 2013, five years into the Volvo Group-Eicher Motors Ltd. joint venture. The decision was taken to start up a dedicated production line exclusively to supply the Volvo Group. In total, around 90 per cent of production is for Volvo Group, with the remaining 10 per cent used by the Eicher brand.

However, when India moves to BS VI emissions standards in 2020, Eicher plans to replace one of its legacy engines with the MDE, which will lead to a significant increase in production. Currently, VEPT is producing about 50,000 engines per annum, which will reach 100,000 engines in the medium term. This exemplifies the success of such joint ventures built on the edifice of trust and knowledge sharing. ■

11.57 am

Waalwijk, the Netherlands

AT THE END OF his morning shift, truck driver Patrick Broeders fills up his new Volvo FH LNG at a filling station on his way back to Kivits Drunen's head office. One full tank is enough to cover up to 900 km. "The performance is really good," he says. "I don't see any differences compared to a normal diesel truck."

Kivits Drunen BV has been transporting fresh produce for over 65 years. To ensure it gets every product to the right destination, in the right time and at the right temperature, it has invested heavily in infrastructure and new vehicles to provide a complete 24-hour climate-controlled supply chain. Recently, the company took delivery of twelve Volvo FH LNG trucks – the first to be delivered in Europe.

Now Volvo Trucks is working on its second generation of LNG-powered vehicles, as part of its involvement in the EU's HDGAS project. ■

PHOTO: SIMON VAN BOXTEL

Think inside the box

Volvo Group IT is testing a start-up package to support the innovative abilities of employees.

TEXT JIMMY HÅKANSSON
PHOTO SANNA TEDEBORG

Lis Tryggö (left) and Sofia Ohnell believe that the Kickbox is perfect to strengthen innovative abilities.

"THIS BOX CONTAINS everything you need to think along new lines," says Lis Tryggö, Business Consultant, Volvo Group IT, as she holds up the Kickbox innovation box. Its contents include chocolate, post-it notes and step-by step instructions explaining how to go from an abstract idea to a concrete proposal.

Lis Tryggö and her colleagues first came across Kickbox at the Innovation Roundtable Summit 2017 in Copenhagen. Produced by Adobe and freely available via open source, Kickbox has been specially developed to support the innovator´s journey. It was ideally suited to the work Lis Tryggö and her colleague, Sofia Ohnell, Innovation Portfolio Manager, Volvo Group IT, were doing to strengthen the organisation's innovative ability.

"Innovation is a word that can be perceived as fluffy. A physical box makes it concrete. As we see it, it's important to create an opportunity where everyone can contribute," explains Sofia Ohnell.

The box is a test pilot in which the participants are each given a box to grow their ideas. At follow-up meetings with the participants, Lis Tryggö and Sofia Ohnell have discovered the ways in which the box does and does not work. It has emerged that a number of participants are working on similar ideas in their individual jobs.

"This test pilot has produced valuable cross-connections between employees at different units and has enabled them to share what they have learned," says Sofia Ohnell.

LIS TRYGGÖ ADDS that the box also has a high symbolic value, as it represents the management's involvement in the question.

"By participating in a Kickbox workshop, employees have an opportunity to work on their ideas without first asking for money or time. The purpose of this box is to support the innovator. Kickbox makes 'bad ideas' grow into good ideas while employees learn the steps in how to think and work as an innovator," concludes Lis Tryggö. ■

Three trends in 'Fintech'

It's not just about new drivelines and vehicle features – new innovations and technological trends are reshaping every facet of the Volvo Group's business, including financial services.

"DISRUPTION IS COMING at us on two fronts," says Allen Atchley, VP Strategy and Innovation, and head of the VFS iLab. "On one side there are transport megatrends – electrification, automation and connectivity – that are heavily impacting the brands and by extension, impacting financial offerings.

Allen Atchley

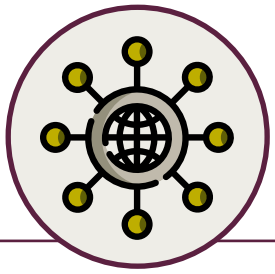
But on the other side, we have disruptive trends in financial services that we need to address."

To respond to both, VFS developed iLab, whose mission it is to identify challenges and opportunities created by disruption, and drive innovation activities in collaboration with VFS colleagues and innovation labs across the Group.

"The three 'Fintech' trends below are VFS' initial prioritized innovation focus areas," says Allen Atchley. "Yet there are other areas of disruption that we are looking at. In 2019, we will begin developing activities for Alternative Lending, Electric Financing, Autonomous Financing and InsurTech."

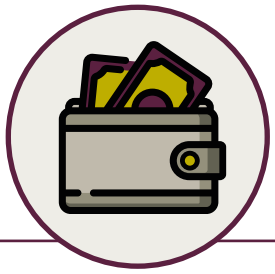
This year, VFS also announced the launch of iLabX, a start-up accelerator program. "iLabX provides entrepreneurial companies the opportunity to work with VFS. The aim is to increase external engagement with start-up companies in order to drive new thinking and develop breakthrough solutions faster." ■

For additional information, visit the VFS iLab Group in Yammer (www.yammer.com/volvo.com) and select "VFS iLab" from the left menu bar.



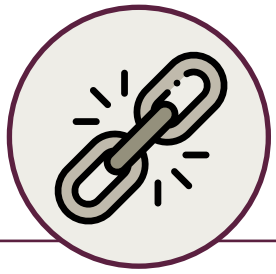
Internet of Things

As more data becomes available from Group products, opportunities to improve financial services are increasing. For example, Connected Insurance, which VFS and Volvo Trucks are currently piloting in Brazil, provides insurers with telematics data – such as speed, hard braking, time and duration of operation – to help better manage risks. The result can be reduced premiums, real-time insurance pricing, and faster claims handling for customers. Dealers benefit too, as it can increase insurance, parts and service sales.



Emerging payments

One of the biggest trends in Fintech is that payments have moved from something that has to be collected from our customers to being a source of insight into their buying behaviour. "There is potential for VFS and the Volvo Group to leverage payments in a more strategic way, while making the payment process more cost-effective and convenient for customers. We're looking with our brand partners at how this can work," says Allen Atchley.



Blockchain

A blockchain is a list of records, called blocks, which are securely linked and shared among agreed partners. Within financial services, blockchain can help improve customer identity management and enable a faster, less invasive method for authenticating customers. It can also manage customer documentation more efficiently, such as vehicle titles, repair history, and warranty registrations. "VFS has established a cross-business working group with colleagues from across the Group to coordinate and align development in this area," says Allen Atchley.

5 QUESTIONS ABOUT INNOVATIVE PURCHASING

It all started with a broken 3D printer. Now, Rachel Spieczny, Director Innovation Development at Group Trucks Purchasing, is introducing innovative ways of thinking in purchasing.

Why is it important for the Volvo Group to be innovative when it comes to purchasing?

"New technologies are coming fast. The Volvo Group should absolutely be at the forefront, collaborating with external partners in order for us to secure customer success. Part of my job is to find additional structures to do this, as well as working cross-functionally internally."

Earlier this year, Innovative Purchasing launched the Innovation Hub. What is it?

"It's an internal website for people working in purchasing, but it's of course open to all employees in the Volvo Group. On the website, employees can submit ideas or share scouting reports and information about the suppliers they are working with, for example. Many people working in purchasing are very external facing and the Innovation Hub is one way to empower them to broaden their scope and bring new technologies into the Volvo Group."

How are you working with suppliers?

"There are a lot of initiatives going on. One example is the Volvo Group Purchasing Innovation Summit. In June, the Volvo Group invited approximately 50 suppliers and partners – both current and potential – to Gothenburg for three days of innovation dialogue. We now follow up and pursue collaboration on innovative ideas together. It's all about co-creation."

Can you give an example of how purchasing can help the Volvo Group to co-create with other companies?

"When I first came on board, I was contacted by GTO who wanted to start using RFID (Radio Frequency IDentification) tags in the warehouse. They had contacted a supplier and wanted my help to negotiate the price down. I suggested we should approach the company in another way. So, instead of just haggling about the price, we changed the conversation and suggested that we should co-create together. At the end of the day, we got a cheaper price, but we also got a broader conversation about what else the company has to offer us and our customers and how we can explore this technology together."

Is there any new technology that you are extra passionate about?

"My personal piece is 3D printing. Some ten years ago, I was working at an architecture firm in California that purchased a 3D printer. When it broke, it ended up in a corner collecting dust. I sort of took it on as a 'pet' project and just fell in love with it. Ever since, I have been working with 3D printing in different ways. I'm 100 per cent convinced that it is the future of manufacturing. At the Volvo Group, 3D printing has been happening in little pockets all around the company. We are now trying to get the dialogue and collaboration going in as many ways as we can, both internally and externally."

LINDA SWANBERG

PHOTO: PATRIK OLSSON

Rachel Spieczny together with her colleagues Daniel Heimer, Director Early Phase Project Office, Eva Bennis, Director Sustainability, and Erik Ifwarsson, Director Business Intelligence. They are all part of Innovative Purchasing, a function that was launched in January 2018.

5 tips to help you think along new lines

TO BE BEST in the world when it comes to sustainable transport solutions, the Volvo Group needs to be at the cutting edge of innovation. However, thinking along new lines calls for courage and creative self-confidence. Jonas Hallberg, Learning Programme Manager for innovation and creativity courses at the Volvo Group University, would like to share five straightforward tips to help you be more creative and innovative in your day-to-day work. ■

TEXT JIMMY HÅKANSSON/
JONAS HALLBERG

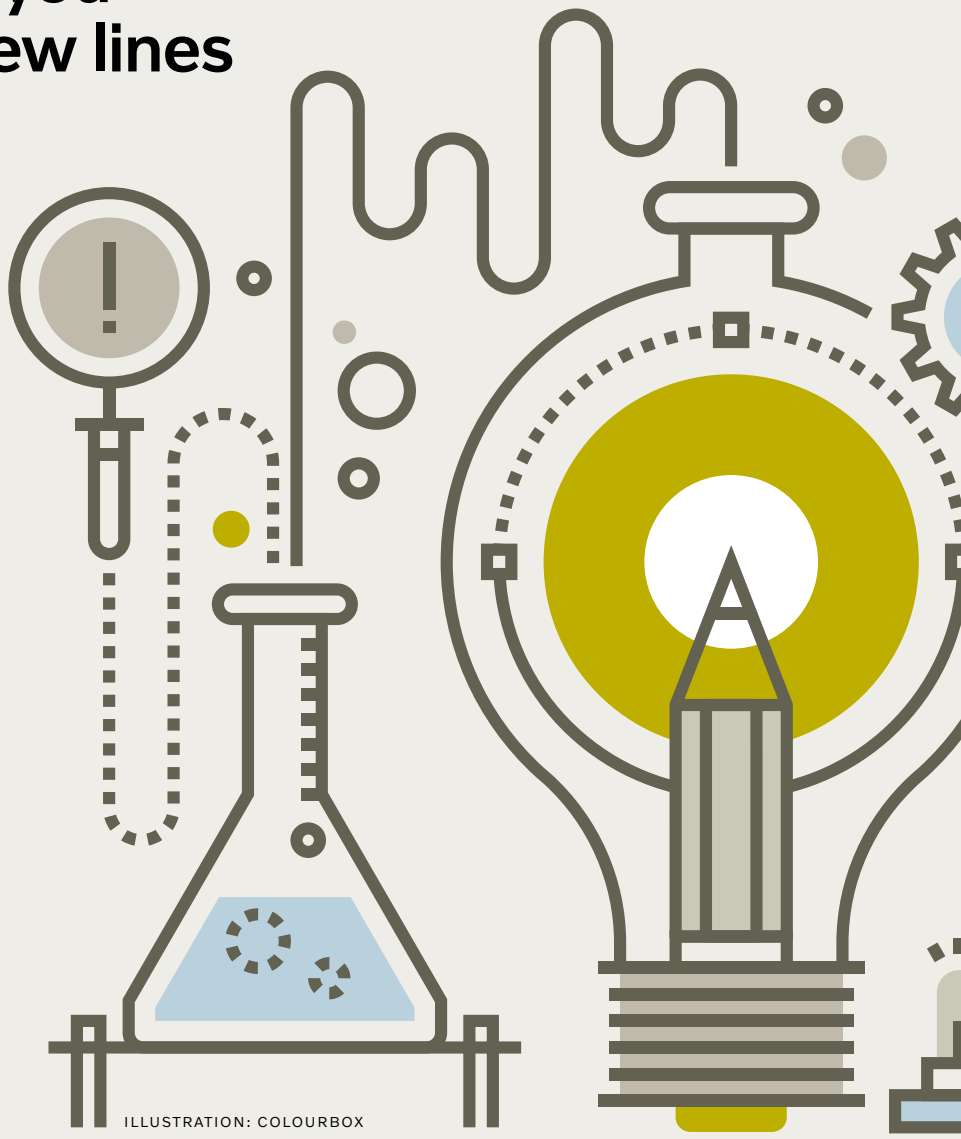


ILLUSTRATION: COLOURBOX

1 Dare to try new things and learn from your mistakes

The story goes that it took Thomas Edison more than 10,000 attempts before he succeeded in making a lamp bulb that worked. In spite of this, he did not regard his previous efforts as failures – quite the reverse. "I have not failed. I have discovered 10,000 ways that don't work." The gist of this is that invention flourishes in forgiving environments where people are allowed to make mistakes and learn from them. So, find colleagues who want to join you and develop your ideas and give feedback without making judgements.

2 The first idea is not always best

The first idea is seldom unique. The more obvious the solution, the more likely it is that someone else has already thought of it! Keep searching to cleanse the system of wasted ideas. Be prepared to challenge your own way of thinking and your own assumptions. Only when you pass the first layer of ideas will you be able to break new ground.

3 Collaborate for new perspectives

Invite someone else to share your idea and give you a new perspective on the problem and the solution. Someone who has needs that differ from yours may have a different perception of the question. The best ideas are frequently the result of an effective innovation network – a group in which differences are compared and considered often produces the best results.

4 Start with a simple prototype

By making a very simple physical prototype of your concept, you can take it from being an idea to reality. Only when you have a rough prototype can you see whether your idea actually functions or whether you need to return to the drawing board. Use everything available – simple things like paper mugs, duct tape and paper clips are perfect – and quickly make a simple prototype. It is easier to discuss things with your colleagues if they can touch and see your idea at the same time.

5 Transform your concept into a narrative

So how should you present your idea in a way that involves people? Remember that you first need to capture your audience – speak to their emotions before you speak to their intellect. Paint a future scenario that shows how your idea can improve the experience of customers and colleagues and then use facts to show that you can actually achieve this.

Would you like to learn more about innovation and creativity? The Volvo Group University is currently offering three courses on the subject: Creativity Basics, Innovation Basics and Innovation Management. You can read more about the courses and apply on Navigator.

JENS HOLTINGER

Unleashing the power of 10,000 decisions

EVERY MINUTE, EVERY hour, many small decisions are taken by employees in the Volvo Group. I am convinced that our organisation's performance, improvement and innovations are based on many of these individual small actions, rather than the big steps and big projects. And, when we are all moving in the same direction, I am absolutely sure we will be the most successful company around.

Our purpose in the Volvo Group is to drive prosperity through transport solutions, in a manner based on values and principles. The way towards this vision is paved every day by every employee, with the mindset of continuous improvement and through real actions.

It is like a flock of birds that flies smoothly in the same direction and arrives at the same destination. They do not need a committee to tell them where to go or what to do. But they have the right conditions and a common purpose, so they can take the right decision.

The speed of change requires a different way of working, it cannot be achieved by a centrally steered organisation. As leaders, we can only be humble and work hard with coaching leadership to get the 10,000 small decisions in the right direction.

WE HAVE SO many intelligent people around! I am working at our plants for majority of my time, meeting people in very different environments. And, every time I leave the sites, I am impressed by what I see. I am astonished by the energy, the pride and the knowledge of all colleagues, especially when they feel empowered to take their own decisions.

How can we as leaders impact? By developing people, communicating and supporting in an open way – and being present. As a leader, my role is to create an environment where people feel prepared to try new things, be innovative, where there is no fear of failing, and where everyone is trusted to act and deliver the 10,000 decisions we need to make our organisation move forward, not least in this technology shift. For me, this is the future. ■

JENS HOLTINGER,
SVP EUROPE & BRAZIL MANUFACTURING, GROUP TRUCKS OPERATIONS

VOLVO
VOLVO GROUP

What year is it?

It would prove to be a significant year for both the Volvo Group and the world in general. Can you guess which year it was from these seven events?

■ Volvo Penta launched its Inboard Performance System (IPS) propulsion system. As a result of its design, which features forward-facing counter-rotating propellers, IPS makes boats faster, more powerful and more fuel efficient, among other things.

■ At a large ceremony in Washington, George W. Bush was sworn in as the President of the USA for the second time.

■ On 26 July, the Discovery space shuttle was launched on its 31st mission. This was the largest space shuttle to leave the earth since the Columbia space shuttle spun out of control and disintegrated a couple of years before.

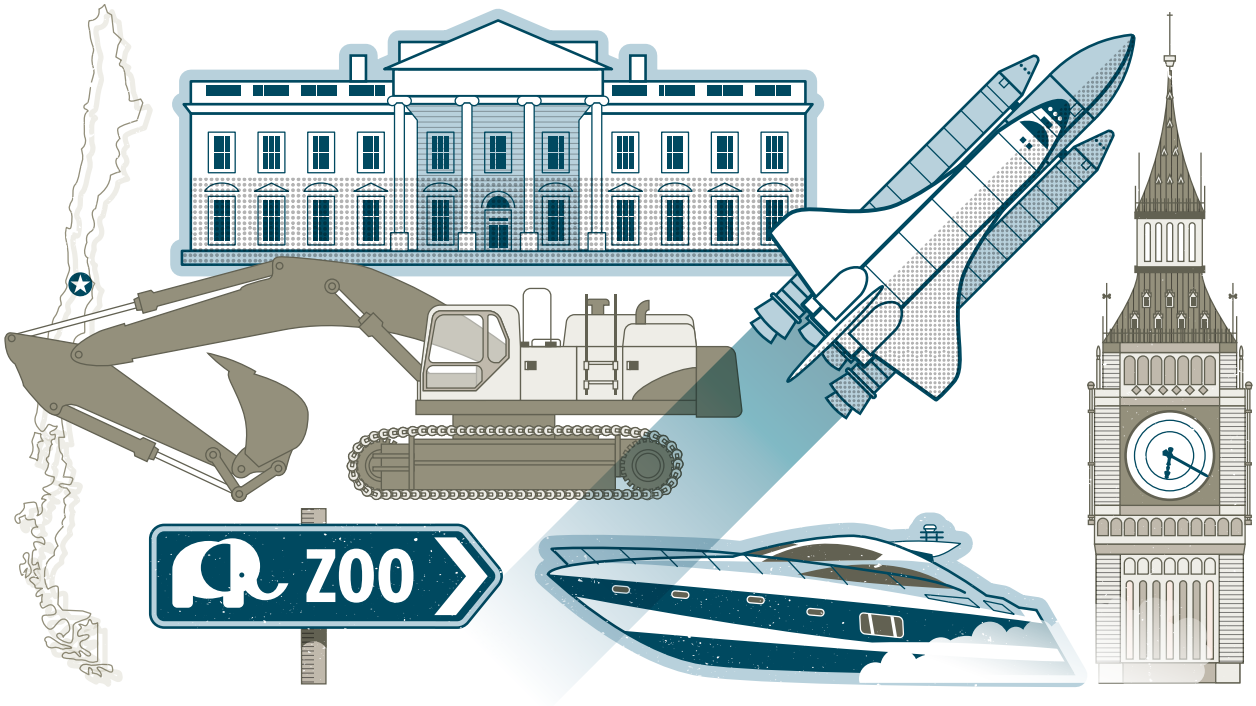


ILLUSTRATION: KEN NISS

■ Volvo Buses received its largest-ever order when 1,767 buses were ordered by Santiago in Chile. They were planned for use in the Bus Rapid Transit public transport system which has special streets for buses.

■ Volvo Construction Equipment presented its largest excavator to date at ConExpo in Las Vegas. This excavator, the EC700B, weighs 70 tonnes and has an output of 464 brake horsepower.

■ On the morning of 7 July, there were four explosions on the London transport network. These bombs, which killed 56 people and injured more than 700, were the first suicide attack in Western Europe.

■ In April, one of YouTube's founders, Jawed Karim, uploaded the first film on the site. The video *Me at the zoo* laid the foundations of YouTube, which currently has more than one billion users.

Read more at www.merchandise.volvogroup.com.

Win a Volvo Zeux by Lego Technic!

One lucky winner will get a Volvo Zeux by Lego Technic. Developed in collaboration with Volvo Product Design, this innovative concept model is packed with realistic details and can be rebuilt into a futuristic Volvo Concept Hauler PEGAX. Email your answers to **groupmagazine@volvo.com** no later than January 31, 2019. Write "Quiz" on the subject line and remember to include your name and address.

The winners of the quiz in Volvo Group Magazine #3 2018 were Omar Abo Fakher, Sweden, Guillaume Rissons, France, and Bert Werniers, Belgium. The correct answer was 1977.